

## Revision of the Australo-Papuan genus *Spilopyra* Baly (Coleoptera: Chrysomelidae: Spilopyrinae)

C. A. M. REID<sup>1</sup> & M. BEATSON<sup>2</sup>

Department of Entomology, Australian Museum, 6 College Street, Sydney, NSW 2010, Australia.

E-mail: <sup>1</sup>chris.reid@austmus.gov.au, <sup>2</sup>max.beatson@austmus.gov.au

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### Abstract

The genus *Spilopyra* Baly is revised, with five valid species, three new: *S. safrina* sp. nov., *S. scratchley* sp. nov., *S. semiramis* sp. nov., *S. stirlingi* Lea, 1914, *S. sumptuosa* Baly, 1860. *Spilopyra stirlingi* is a senior synonym of *S. flavigornis* Weise, 1923 (syn. nov.). Lectotypes are designated for *S. stirlingi* and *S. sumptuosa*. The genus may be considerably more diverse, as three of the species are known from just 7 specimens. *Spilopyra* species occur from northern New South Wales, Australia, to central New Guinea, and known hosts are Sapindaceae.

**Key words:** fiery leaf beetle, morphology, taxonomy

### Introduction

The small leaf-beetle (Chrysomelidae) tribe Spilopyrinae was elevated to subfamilial status in 2000 from several genera placed originally in 4 unrelated subfamilies: Chrysomelinae, Criocerinae, Eumolpinae and Sagrinae (Reid 2000). Spilopyrinae was given subfamilial rank because its unique combination of adult and larval morphological attributes, many of them contextually plesiomorphic, indicated a sister-group relationship with more than one other subfamily, most likely a combination of Eumolpinae, Lamprosomatinae and Cryptocephalinae. An early molecular study of eumolpine phylogeny did not include two of these putative sister taxa, Lamprosomatinae and Cryptocephalinae, so that although Spilopyrinae were separated from Eumolpinae, the relationship of these two subfamilies to each other and other taxa was indeterminate (Gomez-Zurita *et al.* 2005). That study's inappropriate taxon sampling is overlooked by those who cite it as proof of the close relationship of Eumolpinae and Spilopyrinae (Jolivet & Verma 2008 and references therein). More recent large-scale molecular studies (Gomez-Zurita *et al.* 2007) corroborate the morphological evidence (Reid 1995, 2000) and strongly support the validity of Spilopyrinae.

The subfamily Spilopyrinae consists of 8 genera, 5 in Australia (Reid & Beatson 2010). *Spilopyra* Baly, 1860, was erected for a single Australian species in the Eumolpinae (Baly 1860) and later made the type genus of a tribe Spilopyrini Chapuis, which included one other genus, *Callidemum* Blanchard, 1853 (Chapuis 1874). A second species of *Spilopyra* was described by Blackburn (1891) but later placed in the genus *Richmondia* Jacoby, 1898, which remains valid (Reid 2000). Two further species of *Spilopyra* were described by Lea (1914) and Weise (1923), remain in this genus (Reid 2000) and are dealt with below. *Callidemum* belongs to the Chrysomelinae (Reid & Berti 1992; Reid 2006).

The genus *Spilopyra* includes some of the most spectacularly coloured chrysomelids worldwide. Their metallic colouring, highly reflective and varying in hue according to angle, is also found in a few Australian bugs of the family Scutelleridae (Cassis & Vanags 2006) and some Australian species of *Callidemum* (Reid 2006). All feed on plants of the family Sapindaceae and the bugs and chrysomelines are strongly defended chemically. There is no direct evidence that *Spilopyra* uses chemical defence, but it seems likely. The hostplant family Sapindaceae is chemically defended from generalist herbivores with alkaloids (Stevens 2008), which may be sequestered by specialist herbivores.

The genus *Spilopyra* includes 3 described species (Reid 2000), but two of these names are synonymised below. We have examined all type material, all specimens in the Natural History Museum, London, and all major collections in Australia for *Spilopyra*. Other collections are unlikely to have significant numbers of specimens. Only 23 specimens of species other than *S. sumptuosa* have been seen. Five specimens represent 2 species in New Guinea and the remaining 18 specimens, all collected in north Queensland, appear to belong to two species, one of which is variable (see under *S. stirlingi*). All species of *Spilopyra* are described here. Preparation of specimens and morphological terminology are discussed in our previous paper on Spilopyrinae (Reid & Beatson 2010).

## Abbreviations

Collections: AMS (Australian Museum, Sydney), ANIC (Australian National Insect Collection, Canberra), BMNH (Natural History Museum, London), MHNP (Museum National d'Histoire Naturelle, Paris), MMS (Macleay Museum, University of Sydney), NHRS (Naturhistoriska Riksmuseet, Stockholm), QDPI (Queensland Department of Primary Industry, Mareeba), QMB (Queensland Museum, Brisbane), SAM (South Australian Museum, Adelaide), UQB (University of Queensland, Brisbane).

Localities: Ck = Creek, FR = Flora Reserve, Hts = Heights, Mt = Mount, NG = New Guinea, NP = National Park, NQ = North Queensland, NR = Nature Reserve, NSW = New South Wales, QLD = Queensland, R = River, Ra = Range, SF = State Forest, SQ = South Queensland.

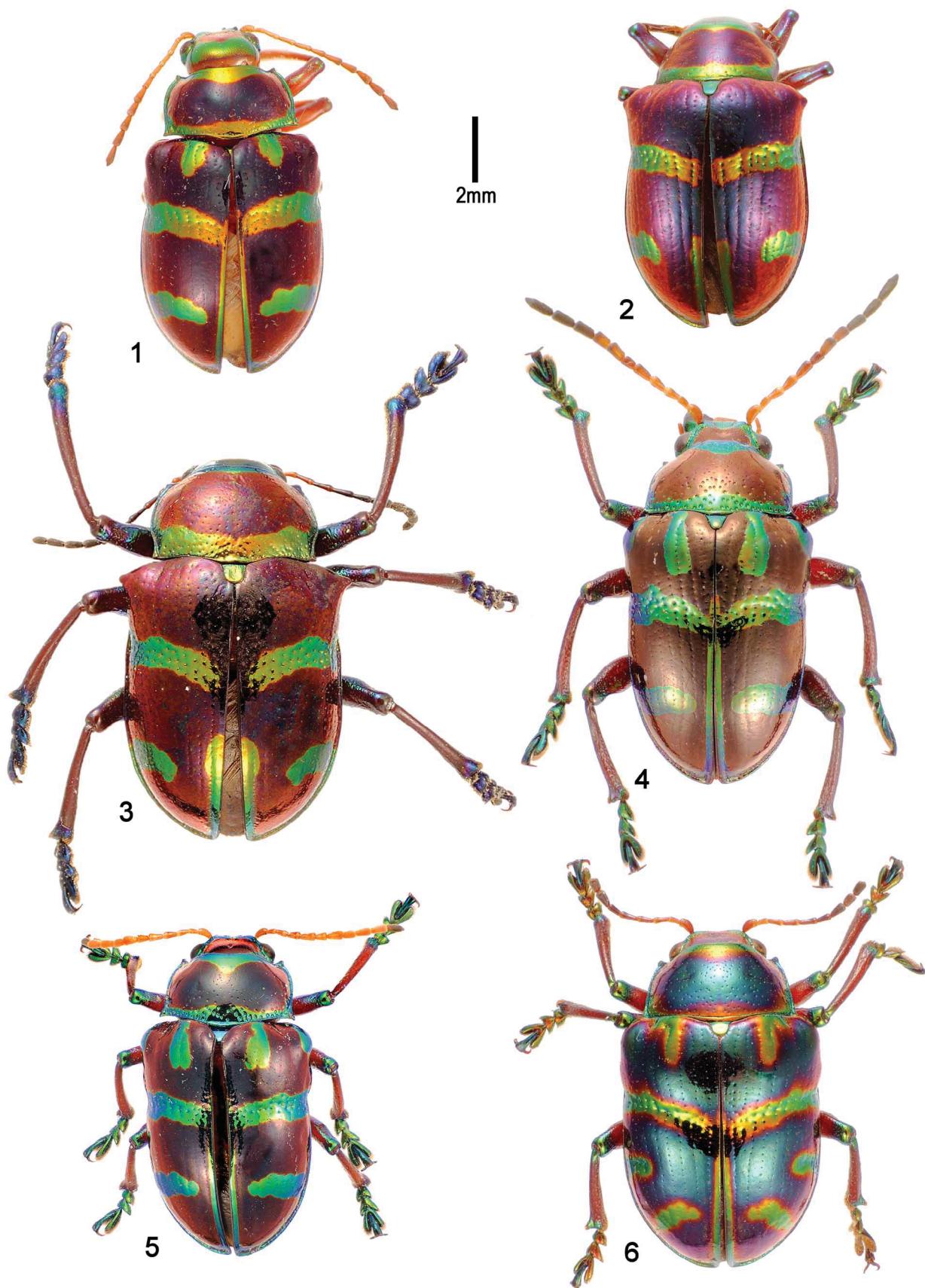
## *Spilopyra* Baly, 1860

*Spilopyra* Baly, 1860: 24

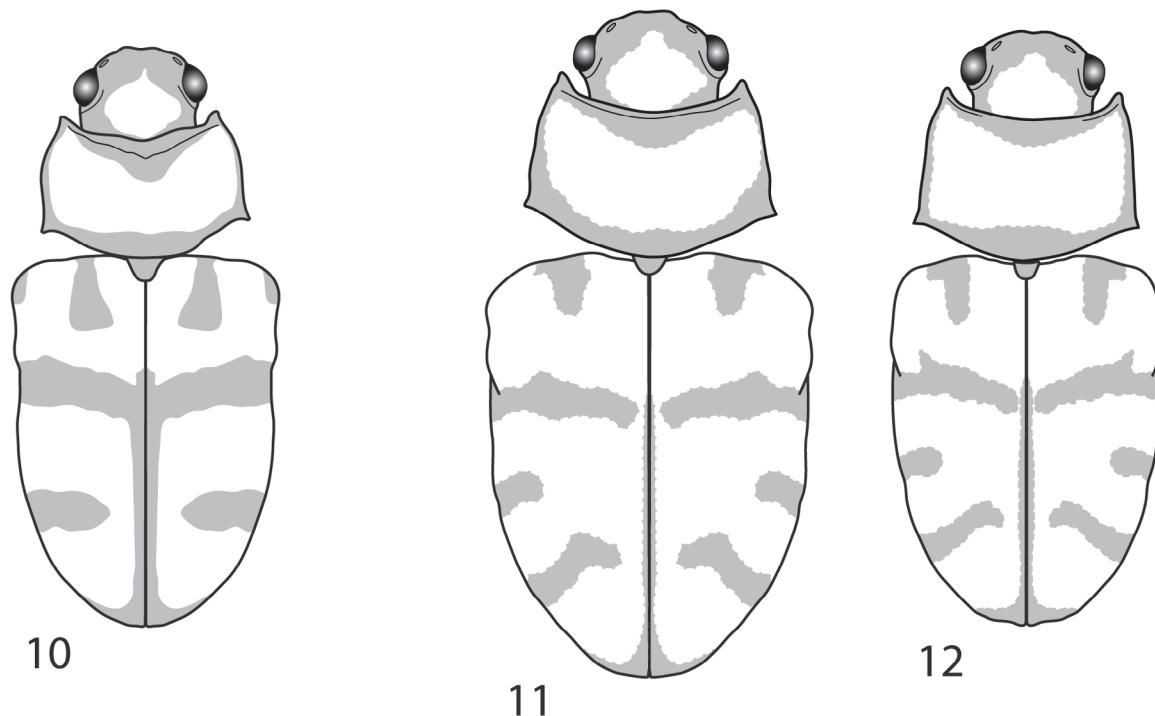
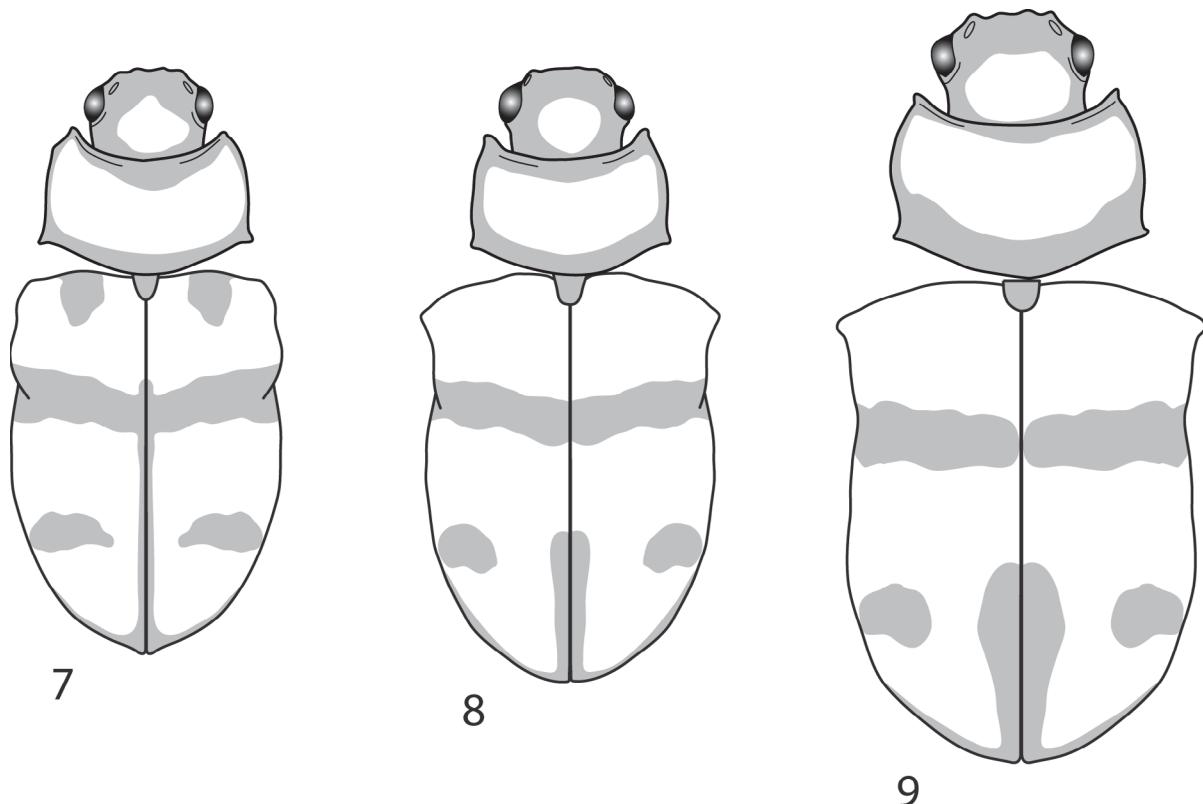
Type species : *Spilopyra sumptuosa* Baly, 1860, by original designation and monotypy

**Diagnosis.** Length 8–13mm; shape roughly ovoid, profile strongly elevated at base of elytra; head, pronotum and elytra metallic coloured, almost entirely glabrous and shining, with contrastingly-coloured areas; pronotum margined at sides and base; prosternal process raised throughout, with apex medially produced or bilobed; elytra transversely depressed behind humerus, striate, 9 striae present but striae 6–9 may be partly obscured by additional punctures; epipleuron gradually expanded from humerus to apex (upper margin may be obliterated at base); mesosternal process transverse, apex shallowly to deeply concave; tibial spurs 1+2+2; claws simple, with slight angulation at base of ventral margin; ventrites 1 and 2 fused; tegmen with internal median keel; male spiculum relictum laminar with short basal apodeme; female median sclerite present on ovipositor; kotpresse present.

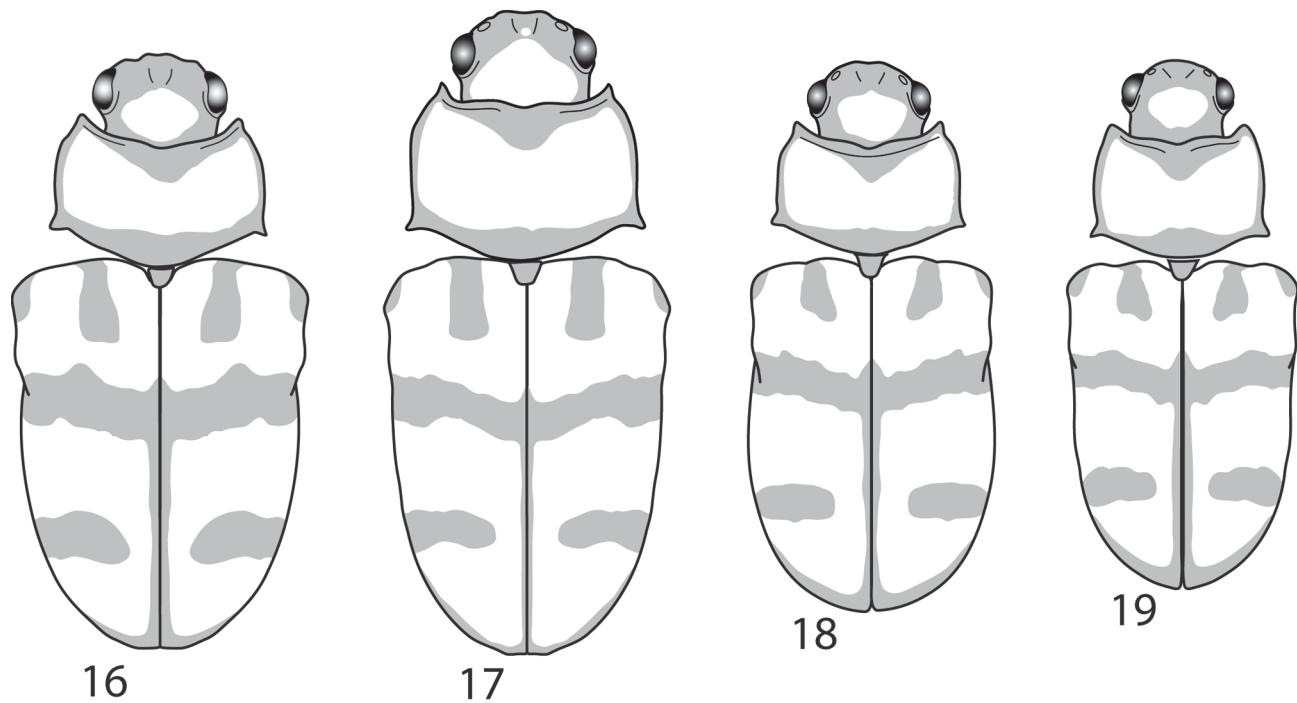
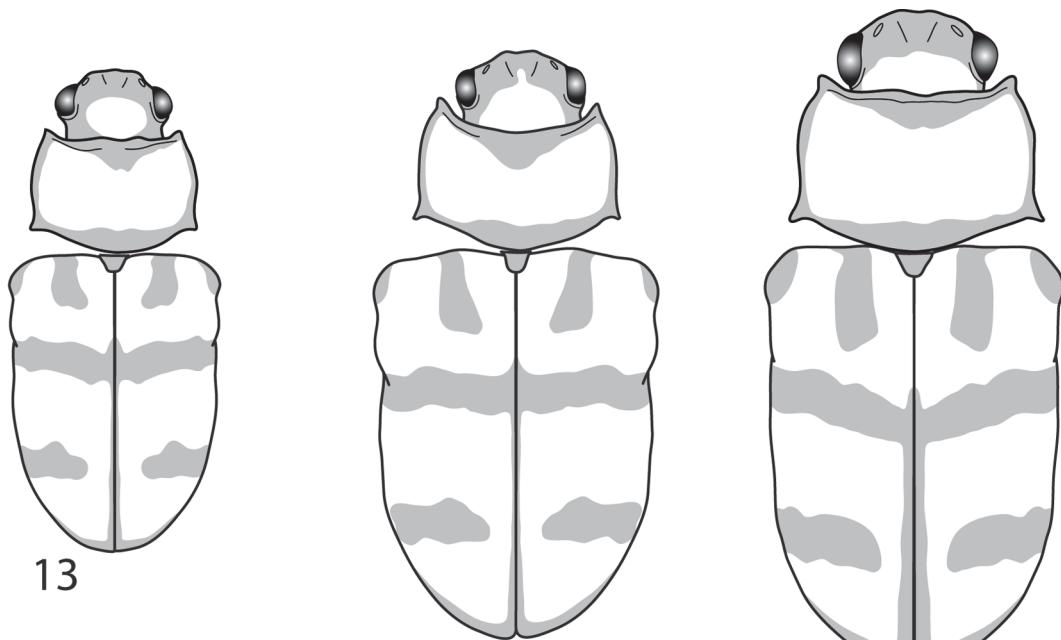
*Spilopyra* is easily distinguished from other Spilopyrinae by the high contrast dorsal patterns of metallic colour, which vary in hue according to viewpoint.



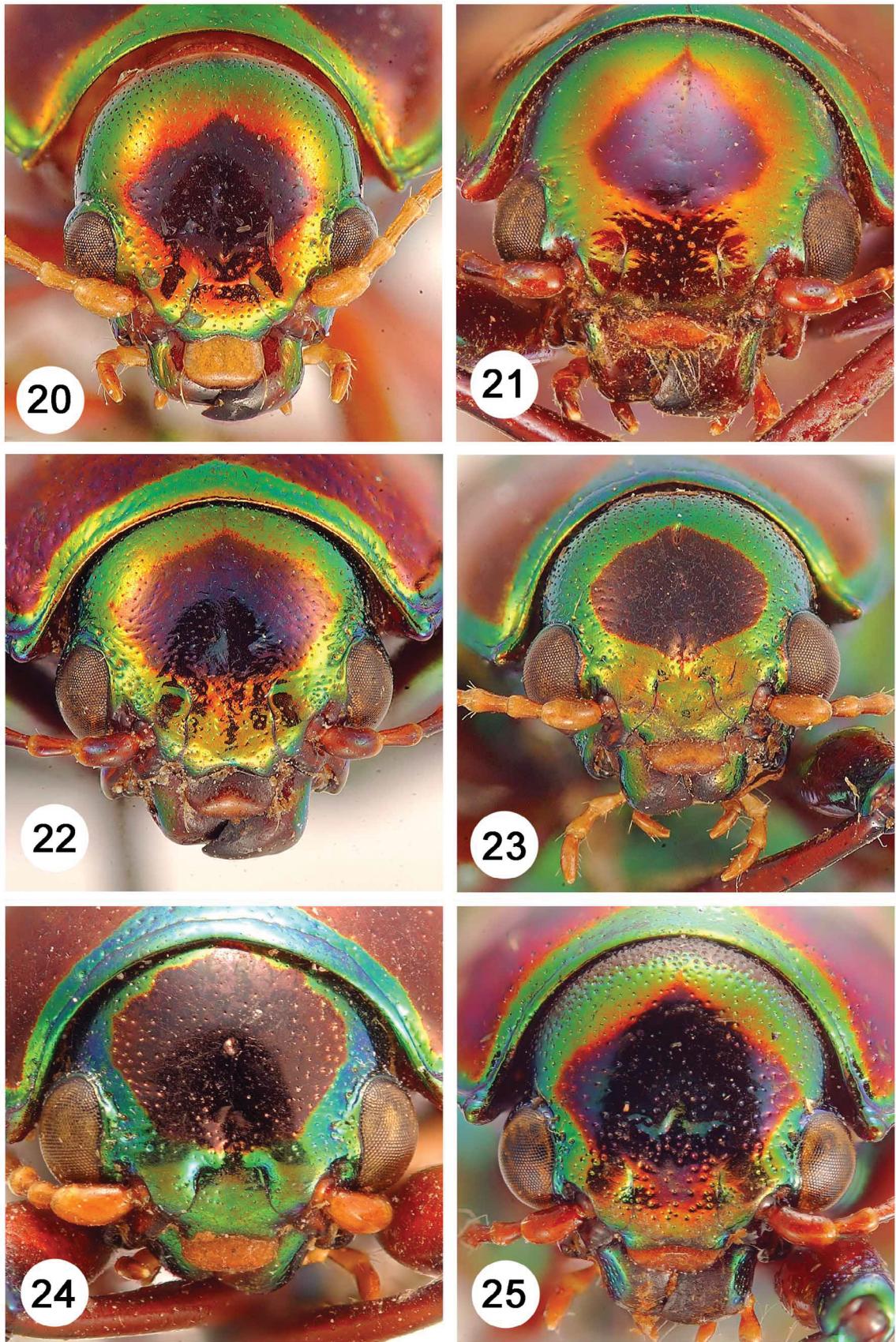
**FIGURES 1–6.** *Spilopyra* species, dorsal: 1, *S. safrina* sp. nov.; 2, *S. scratchley* sp. nov.; 3, *S. semiramis* sp. nov.; 4, *S. stirlingi* Lea (Mount Lewis); 5, *S. stirlingi* Lea (Davies Creek); 6, *S. sumptuosa* Baly. Scale bar = 2mm.



**FIGURES 7–12.** *Spilopyra* species, dorsal (pronotum and elytra separately drawn at right angles to their axes; blue or green areas stippled; groove adjacent to eye and anterior pronotal margination indicated): 7, *S. safrina* sp. nov.; 8, *S. scratchley* sp. nov.; 9, *S. semiramis* sp. nov.; 10, *S. stirlingi* Lea (Mount Carbine); 11, *S. sumptuosa* Baly (Tambourine); 12, *S. sumptuosa* Baly (Gympie). Drawn to scale.

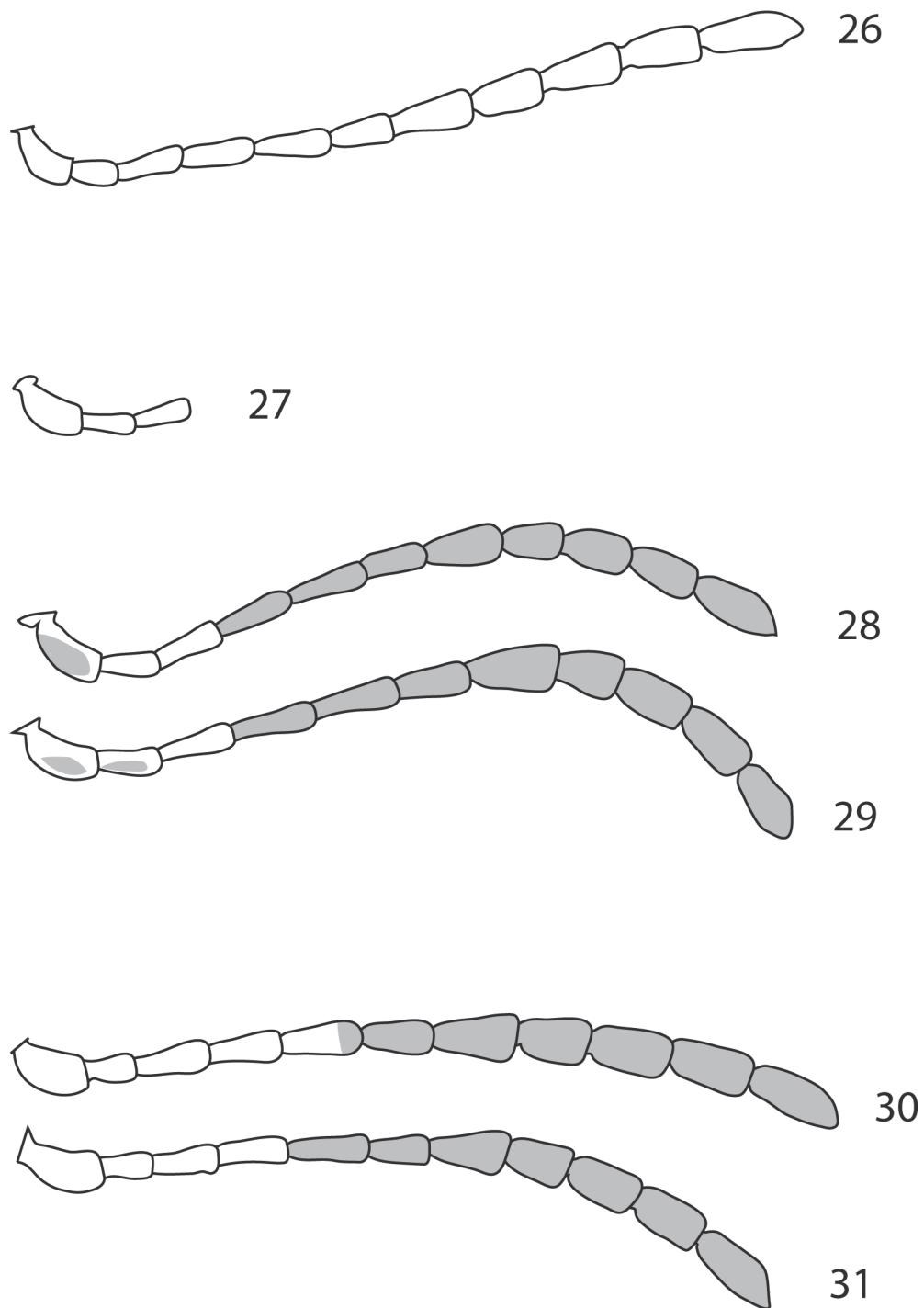


**FIGURES 13–19.** *Spilopyra stirlingi* Lea, dorsal (pronotum and elytra separately drawn at right angles to their axes; blue or green areas stippled; groove adjacent to eye and anterior margination pronotum indicated): 13, Cairns, lectotype; 14, Cedar Creek, holotype of *S. flavipennis* Weise; 15, Mount Lewis; 16, Bartle-Frere; 17, Herberton; 18, Curtain Fig; 19, Lake Eacham. Drawn to scale.

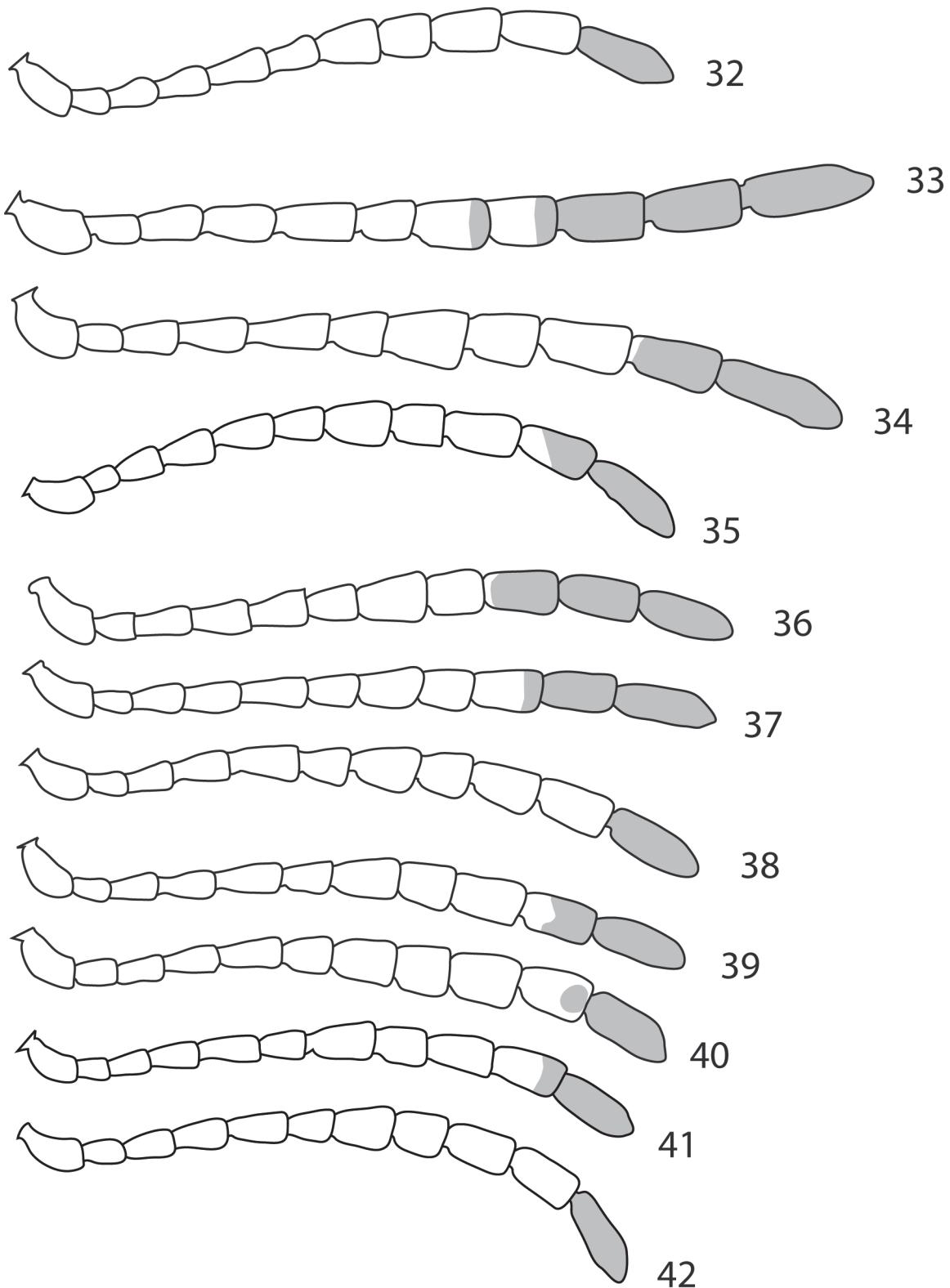


**FIGURES 20–25.** *Spilopyra* species, head: 20, *S. safrina* sp. nov.; 21, *S. scratchley* sp. nov.; 22, *S. semiramis* sp. nov.; 23, *S. stirlingi* Lea (Davies Creek); 24, *S. stirlingi* Lea (Mount Lewis); 25, *S. sumptuosa* Baly. Drawn to scale.

**Description.** Length 8–13mm, females slightly larger than males on average but with considerable overlap in range; body (Figs 1–19) elongate-ovate, length 2.5–3.0 times width, with broad base of pronotum and prominent elytral humeri, strongly convex in profile, length 2.7–3.4 times height, with elytra separately convex at base. Dorsum shining and smooth, coloured metallic green, blue, purple or red, depending on angle of light, without unmetallic areas, glabrous except trichobothria adjacent to eyes and on each corner of pronotum, or with additional minute setae on vertex, pronotum and margins of elytra. The metallic-coloured areas are of contrasting hues which vary in colour according to angle of incident light: areas of bluish-black to reddish-purple contrasting with golden to dark green.



**FIGURES 26–31.** *Spilopyra* species, antenna: 26, *S. safrina* sp. nov., female; 27, *S. scratchley* sp. nov., female; 28, *S. semiramis* sp. nov., female; 29, *S. semiramis* sp. nov., male; 30, *S. sumptuosa* Baly, male; 31, *S. sumptuosa* Baly, female. Drawn to scale.



**FIGURES 32–42.** *Spilopyra stirlingi* Lea, antenna: 32, male, lectotype, Cairns; 33, male, Mount Lewis; 34, male, Herberton; 35, male, Lake Eacham; 36, female, Mount Carbine; 37, female, Mount Lewis; 38, female, Davies Creek; 39, female, Davies Creek; 40, female, Bartle-Frere; 41, female, Curtain Fig; 42, female holotype *S. flavipennis* Weise, Cedar Creek. Drawn to scale.

Head (Figs 1–42): fronto-clypeal suture present, poorly defined at middle, deeply grooved near antennal sockets; clypeus smooth, anterior margin shallowly concave, base generally depressed between eyes; frons

and vertex smooth usually with short longitudinal depression between eyes, groove at inner and posterior margin of eye, defining temple (absent in *S. scratchley*); eye ovate, greatest length c. 1.5 times width, inner margin shallowly concave; eye laterally projecting, posterior curvature contiguous with short temples (c. 1/3 length eye in dorsal view), which are abruptly constricted to parallel-sided base of head capsule; gena 0.17–0.3 times greatest eye length; antennae 3.5–5 times socket diameters apart; antennae 0.55–0.7 times body length (relatively longer in males); relative lengths and shapes of antennomeres variable, but all elongate, 1 cylindrical or widest at apex, 2 shortest (0.5–0.67 times first), 6 second shortest, 3 equal to or shorter than 1, antennomeres 8–11 almost parallel-sided, 11 longest; antennomeres 1–6 shining and sparsely punctured, 7 (not base in *S. sumptuosa*) to 11 dull and densely microsculptured; labrum with 2–4 pairs of setae, on side margins only; mandible with single apical tooth and two setose membranes (pulvilli) at middle and base of inner margin; apical maxillary palpomere elongate, fusiform to cylindrical, males without distinctly broader truncate apex; preapical palpomere triangular, shorter than apical, and of similar width; mentum transverse, width 3–4 times median length, anterior deeply concave.

Thorax (Figs 1–25, 43–76): pronotum transverse, width 1.5–1.7 times length, broadest at basal angles, narrowest at anterior angles and sides feebly to strongly convex between angles; anterior angles acute to right-angled, anteriorly projecting, posterior angles acute to right-angled, laterally projecting, each with single trichobothria; disc with or without pair of poorly defined lateral depressions; anterior edge concave, posterior convex; anterior (at least at sides) and base distinctly margined, lateral margination distinct and complete; posterior trichobothria on vertical plane above posterior margin of hypomeron; posterior edge of hypomeron not projecting into hollowed base of elytra; prosternum flat and punctate between coxae and head; prosternal process broad and arched to apex, with convex or bilobed apex; procoxal cavities closed by insertion of hypomeral lobes into prosternal process; scutellum semi-ovate or with straight sides (shape and sculpture variable within species), base abruptly broadened, apex superimposed on elytra; elytra broadest at strongly developed humeri which may be laterally produced; basal third of elytron demarcated by transverse groove from epipleuron to suture; long scutellary striole and 9 striae present, plus series of large punctures at epipleural margin, striae 6–9 often largely obscured by additional punctures; elytral epipleuron narrow, width <0.2 times elytral width, entirely visible laterally, slightly sinuate, gradually contracted from base to apex; mesoventrite well-developed, punctured, with transverse and parallel-sided median process; anterior of mesoventrite process strongly elevated, apex shallowly to deeply concave; wings fully developed, anal region with two cells and 4 apical branches; metaventrite shining, smooth or feebly transversely wrinkled, transverse, width c. 3.3 times length, anterior border with elevated margin; metepisternum smooth, shining or weakly microreticulate; all femora fusiform, with base and apex narrowed, without longitudinal keels or ridges; all tibiae round in section, without keels, thin, with abruptly expanded apices; 1 short apical spur on protibia, 2 on remainder; all first tarsomeres with oval patch of modified setae in males, with dense simple setae diverging from midline in females; apex second tarsomere concave; third tarsomere deeply bilobed, lobes approximately 2 times median length; claws simple, without basal tooth.

Abdomen (Figs 77–114): pygidium (tergite 7) not strongly sclerotised except at apex, basal two-thirds membranous, apical third pubescent and punctured, without median groove; ventrites I–V shining, not or feebly microsculptured, each with pair of lateral depressions (indistinct on V); ventrite I with semicircular intercoxal process and without femoral plates; ventrites I and II completely fused; ventrite V smooth, not medially depressed, and truncate or convex at apex in both sexes, but slightly shorter in male.

Male (Figs 79, 81–84): sternite VIII (spiculum relictum) fan-shaped, or broadly transverse, with short basal apodeme; sternite IX Y-shaped; tegmen broadly U-shaped with area between sides sclerotised and internal median keel; penis simple, flattened tubular, apex sparsely microsculptate, basal foramen 0.35–0.5 times length of penis; median endophallic sclerites present but poorly differentiated; ejaculatory duct with long thickened sperm pump and valve; two pairs of partly fused testes, radially grooved; accessory gland short and simple.

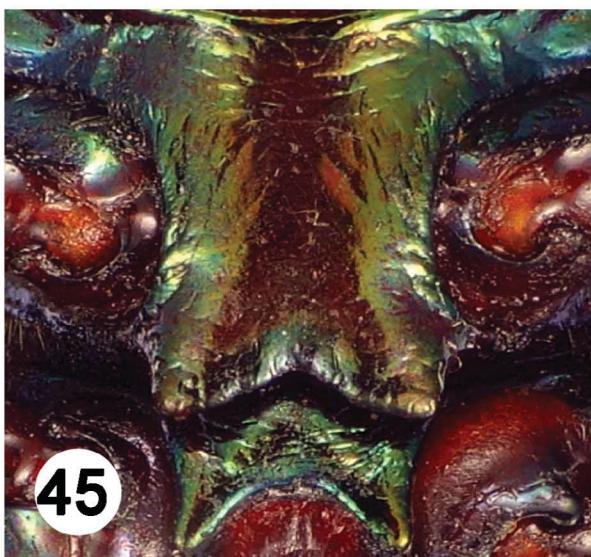
Female (Figs 80, 85–108, 110–114): tergite VIII well-developed; sternite VIII with basal apodeme; ovipositor with thin bacillus wrapped around base of paraprocts, which are well-developed, partly enclosing basal half of palpi, pair of well-defined elongate proctigers dorsal to these; vaginal palpi 2-segmented, gonocoxite massive, not divided, gonostylus small, slightly longer than wide; membranous pad between palpi



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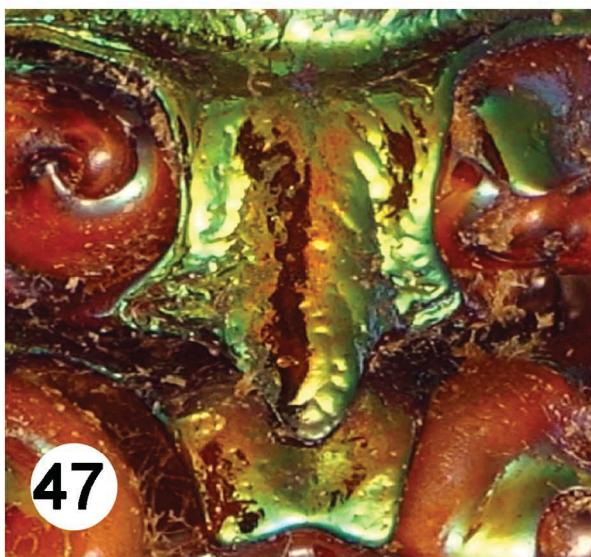
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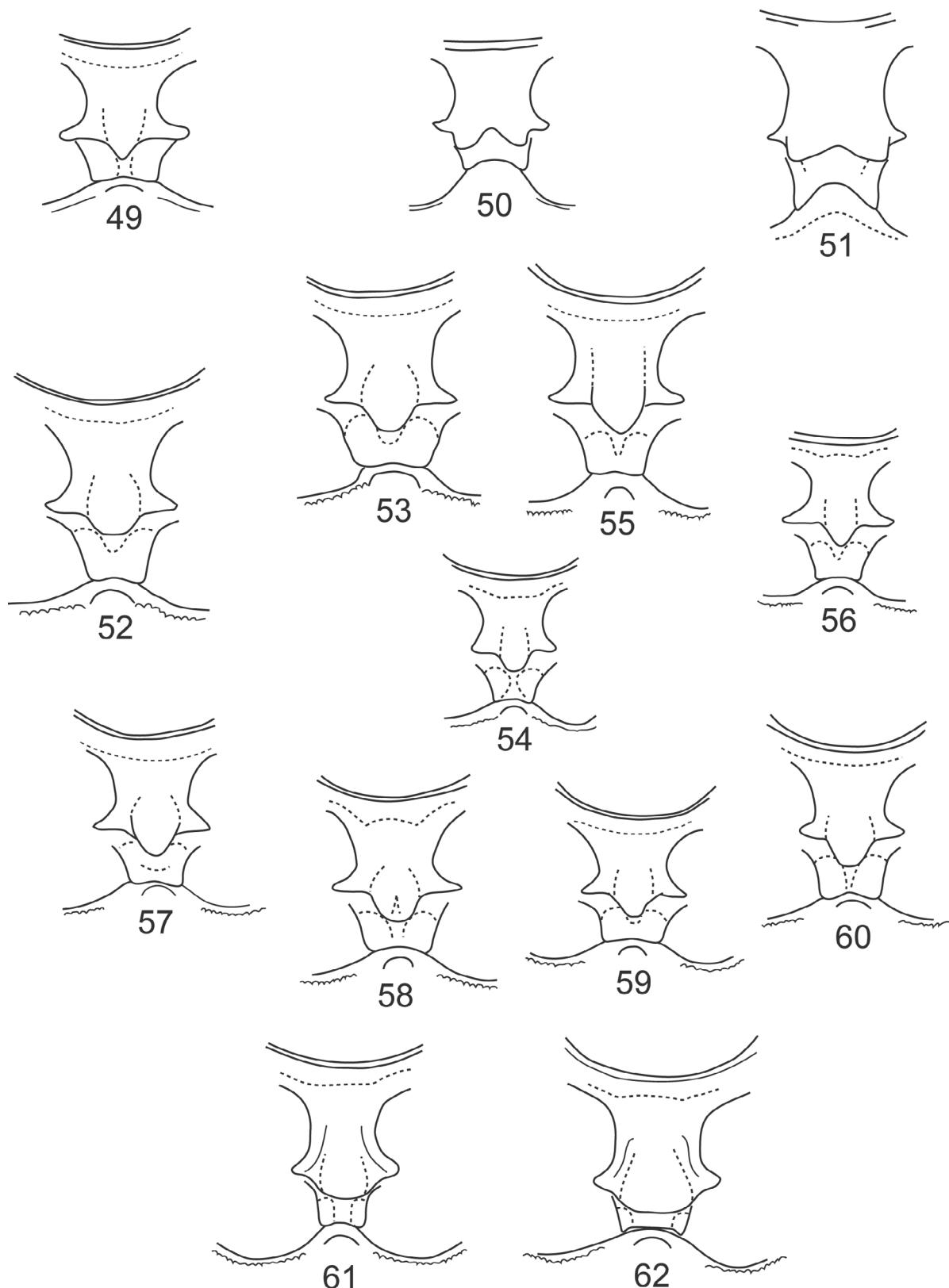


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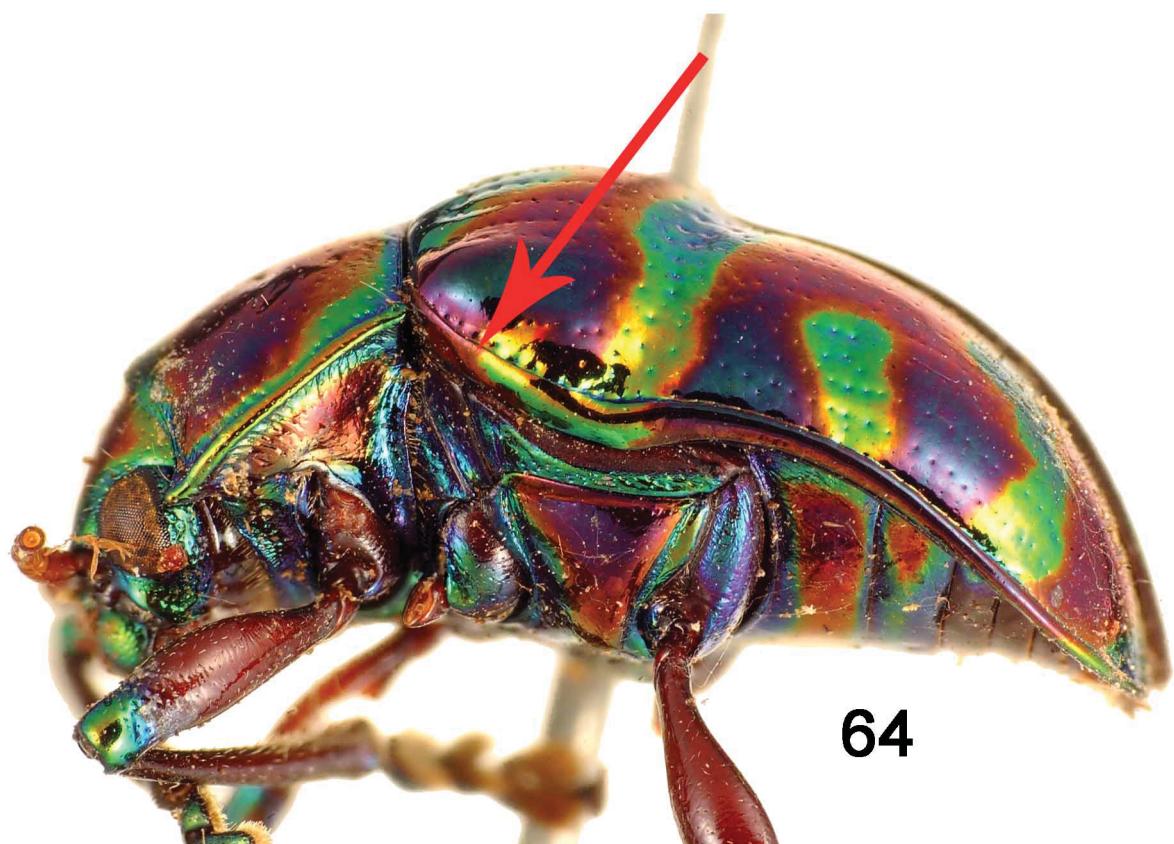
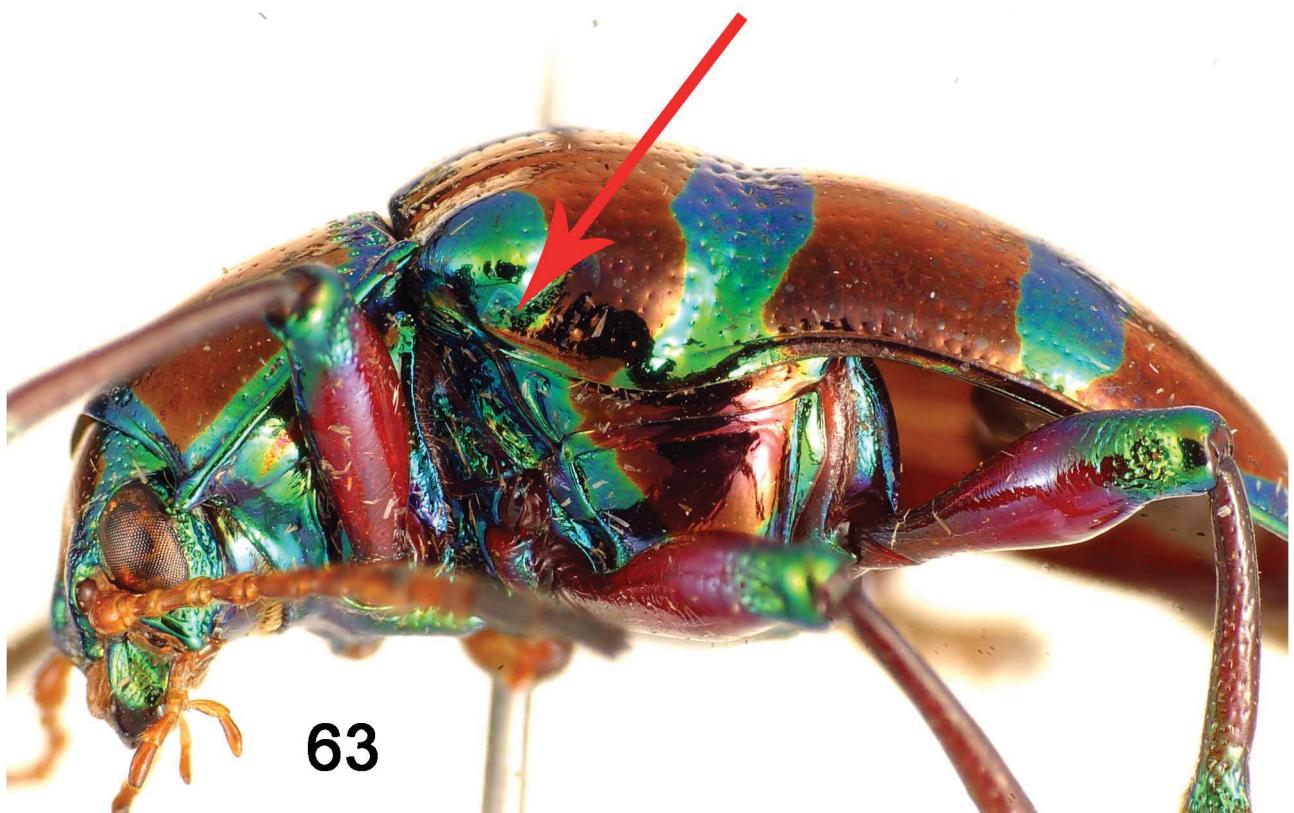


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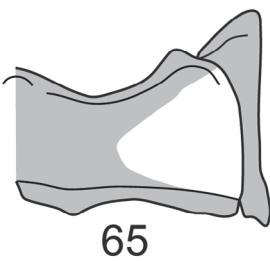
**FIGURES 43–48.** *Spilopyra* species, prosternal process: 43, *S. safrina* sp. nov.; 44, *S. scratchley* sp. nov.; 45, *S. semiramis* sp. nov.; 46, *S. stirlingi* Lea (Mount Lewis); 47, *S. stirlingi* Lea (Davies Creek); 48, *S. sumptuosa* Baly.



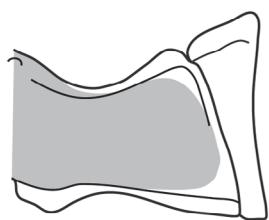
**FIGURES 49–62.** *Spilopyra* species, prosternal and mesoventrite processes and antero-median border of metaventrite: 49, *S. safrina* sp. nov.; 50, *S. scratchley* sp. nov.; 51, *S. semiramis* sp. nov.; 52, *S. stirlingi* Lea (Mount Lewis); 53, *S. stirlingi* Lea (Mount Carbine); 54, *S. stirlingi* Lea (lectotype, Cairns); 55, *S. stirlingi* Lea (Herberton); 56, *S. stirlingi* Lea (Lake Eacham); 57, *S. stirlingi* Lea (Davies Creek); 58, *S. stirlingi* Lea (Mount Bartle-Frere); 59, *S. stirlingi* Lea (Curtain Fig); 60, *S. stirlingi* Lea (holotype *S. flavipennis* Weise, Cedar Creek); 61, *S. sumptuosa* Baly (Gympie); 62, *S. sumptuosa* Baly (Lismore). Drawn to scale.



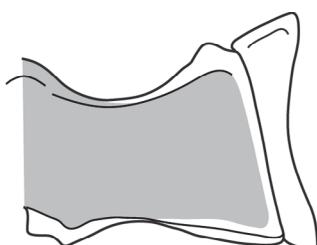
**FIGURES 63–64.** *Spilopyra* species, lateral: 63, *S. stirlingi* Lea; 64, *S. sumptuosa* Baly.



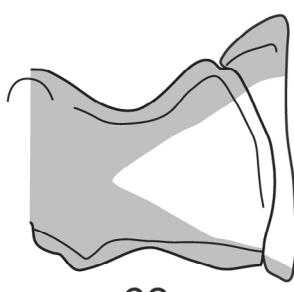
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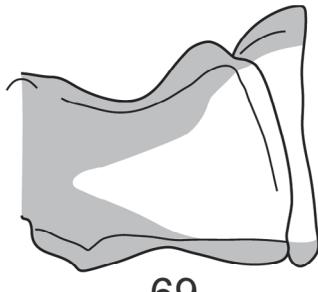
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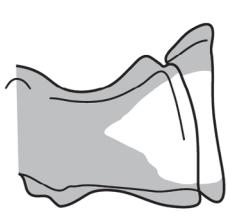
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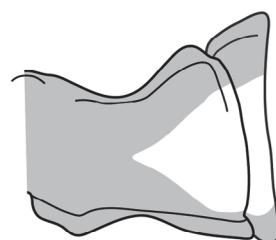
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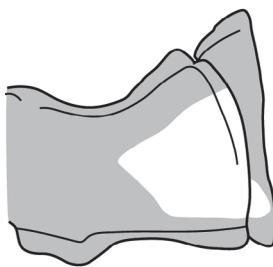
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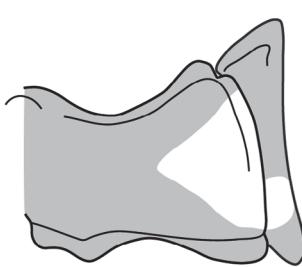
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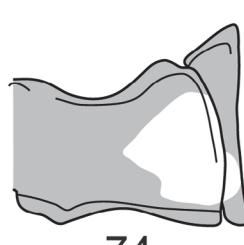
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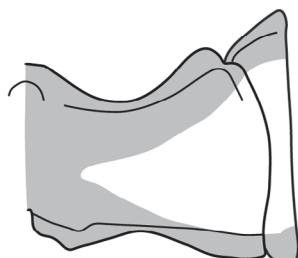
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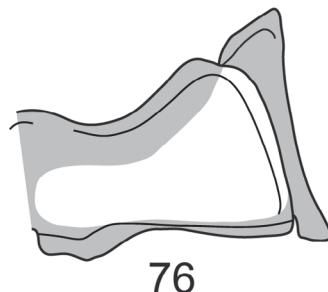
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**FIGURES 65–76.** *Spilopyra* species, metepisternite and metaventrite, golden or green reflective area shaded: 65, *S. safrina* sp. nov. (Mount Windsor); 66, *S. scratchley* sp. nov.; 67, *S. semiramis* sp. nov.; 68, *S. stirlingi* Lea (Mount Lewis); 69, *S. stirlingi* Lea (Mount Carbine); 70, *S. stirlingi* Lea (lectotype, Cairns); 71, *S. stirlingi* Lea (holotype of *S. flavigennis* Weise, Cedar Creek); 72, *S. stirlingi* Lea (Davies Creek); 73, *S. stirlingi* Lea (Bartle-Frere); 74, *S. stirlingi* Lea (Curtain Fig); 75, *S. stirlingi* Lea (Herberton); 76, *S. sumptuosa* Baly (Nightcap Range). Drawn to scale.



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**FIGURES 77–78.** *Spilopyra* species, lateral view of abdominal ventrites: 77, *S. safrina* sp. nov.; 78, *S. stirlingi* Lea (lectotype).

with elongate median sclerite; spermatheca generally U-shaped, surface microreticulate, with short (about length of spermatheca) at least slightly coiled spermathecal duct.

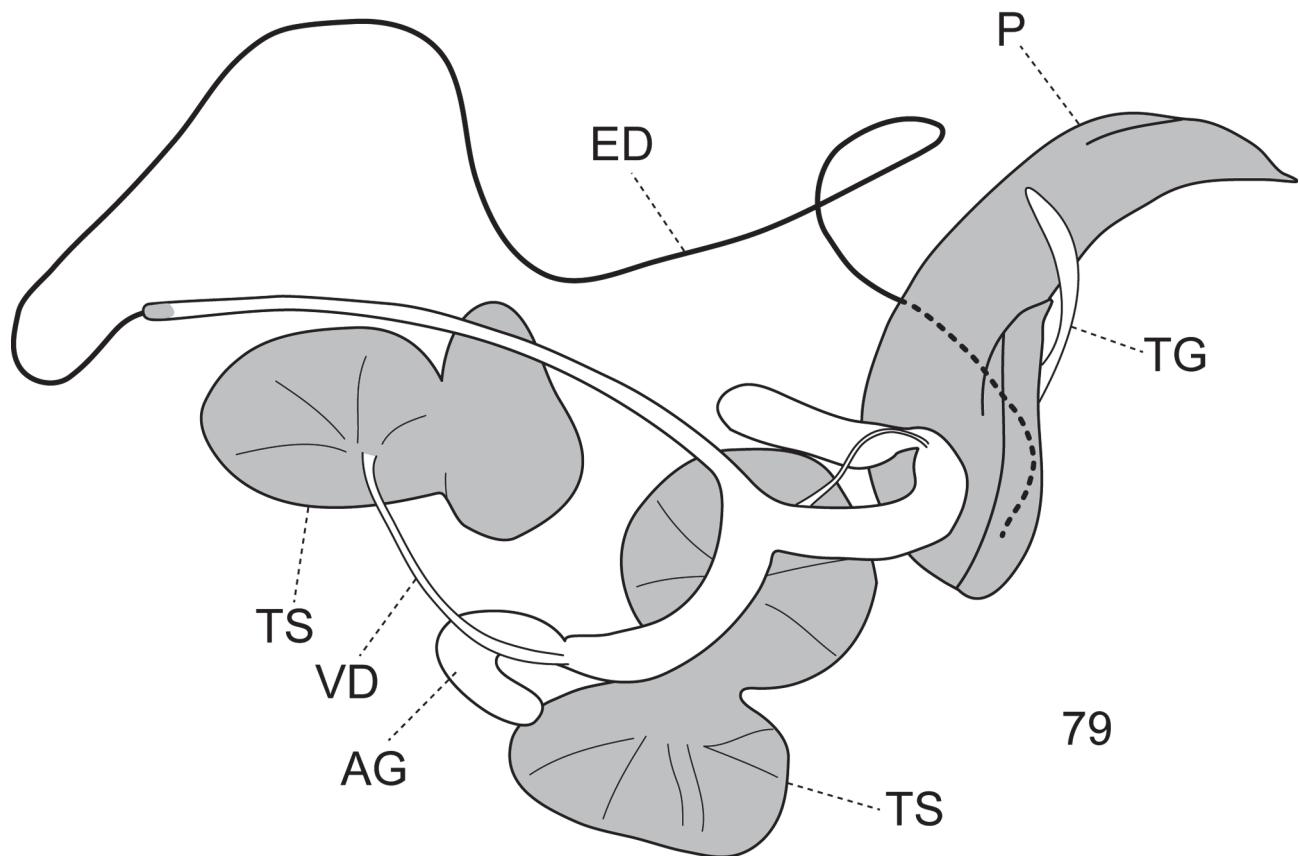
Gut (Figs 109–114): midgut without micropapillae (*contra* Mann & Crowson 1983), but a ring of caeca present at junction of midgut and foregut. Female rectum with kotpresse present, as continuous band of elongate spinules, dense on dorsal and ventral surfaces and sparse at sides. The kotpresse does not appear to vary significantly between species, except that *S. semiramis* has 2 slightly denser lines of spinules on each side.

**Sexual dimorphism.** External sexual dimorphism is limited to size (females on average slightly larger), relative size of antennae and eyes (larger in males), first tarsomeres (slightly enlarged, with ventral disc of specialised setae in male) and apex of last ventrite (more broadly truncate in males). From the limited material available (two species lack males), there is little variation in the penis but other male sclerites show useful variation (tegmen and spiculum relictum), as seems typical of Spilopyrinae (Reid 1992; Reid & Beatson 2010).

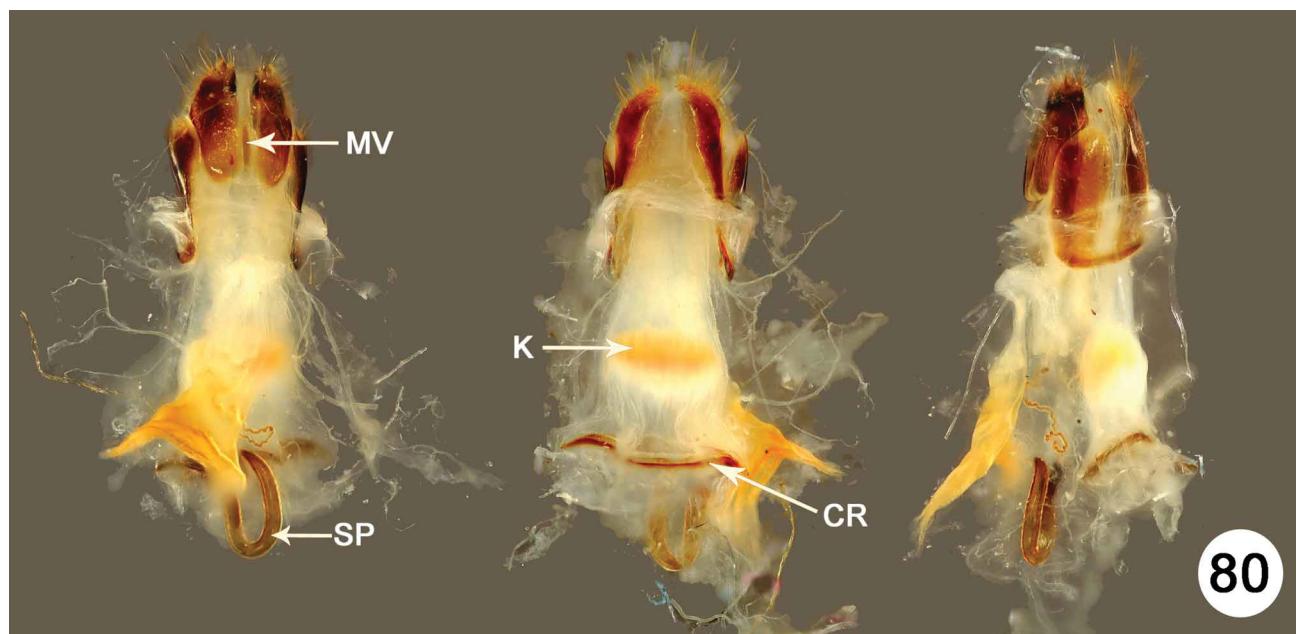
**Distribution and biology.** *Spilopyra* is confined to Australia and New Guinea. It occurs on eastern ranges and coastal plains of Australia, from Lismore, New South Wales, north to Cape York Peninsula, Queensland. Two species are recorded from single localities in the New Guinean highlands.

*Spilopyra sumptuosa* is the only commonly collected species. The adult and larva feed on leaves of two genera of riparian and rainforest Sapindaceae of the *Cupania* generic group in the subfamily Sapindoideae (Buerki *et al.* 2009). Hostplants for other species of *Spilopyra* are not known, but one specimen of *S. stirlingi* has been collected on *Arytera*, another genus of the *Cupania* group (*loc. cit.*). Eggs of *S. sumptuosa* are laid singly on leaves, each egg covered in a rough shell, comprising excrement, glandular material and a layer of chewed plant tissue (Figs 115–116). The first instar larva has been described (Reid 2000; Fig. 117). It is distinguished from other genera of Spilopyrinae by: frons split transversely into two sclerites; 5 pairs of

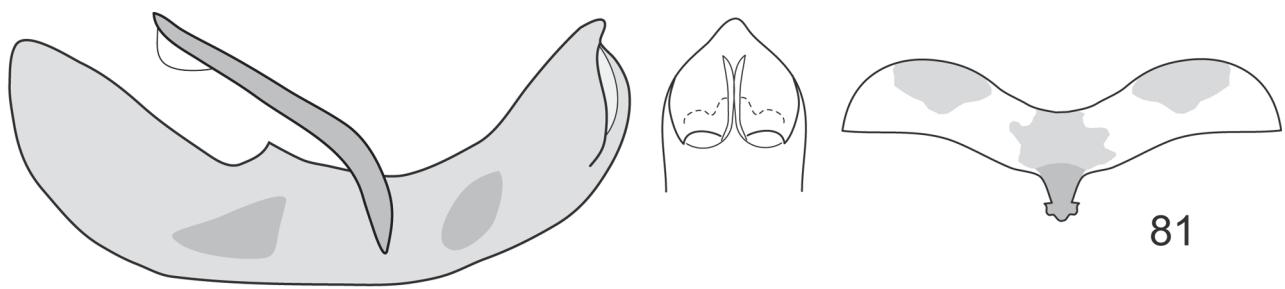
eggbursters; apex of abdomen not flattened into a circular plate fringed with setae. Larval development has not been observed and it is possible that larvae feed nocturnally, sheltering during the day, as they are not collected with adults (CAMR, *pers. obs.*). Pupation is unknown.



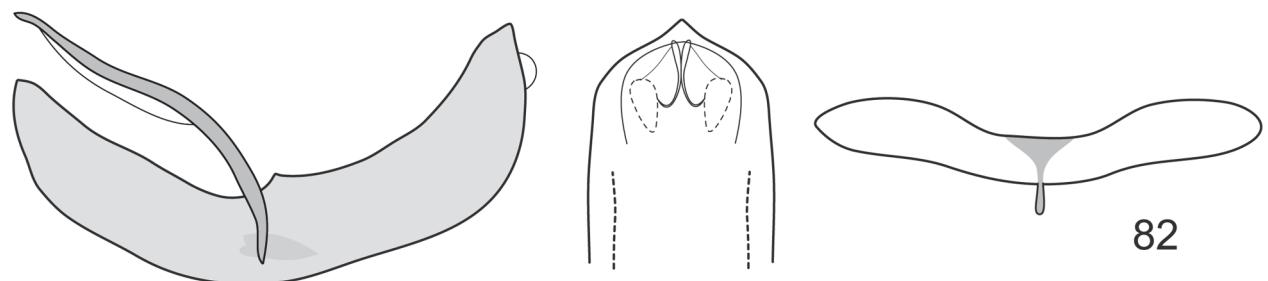
**FIGURE 79.** *Spilopyra sumptuosa* Baly, male genitalia. AG = accessory gland, ED = ejaculatory duct, P = penis, TG = tegmen, TS = testis, VD = vas deferens.



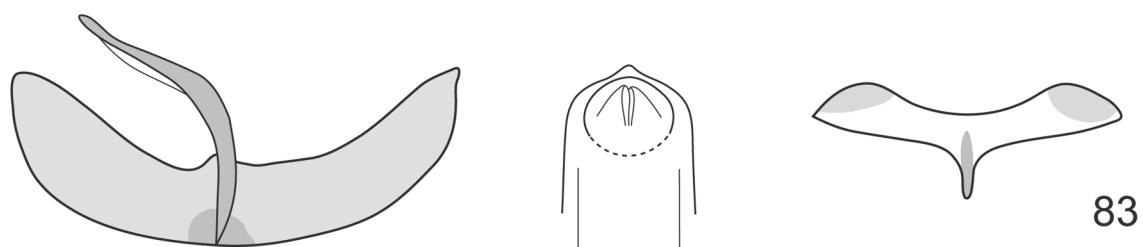
**FIGURE 80.** *Spilopyra stirlingi* Lea (Curtain Fig), female genitalia, ventral, dorsal and lateral. CR = chitin ring; K = kotresse; MV = median ventral sclerite; SP = spermatheca.



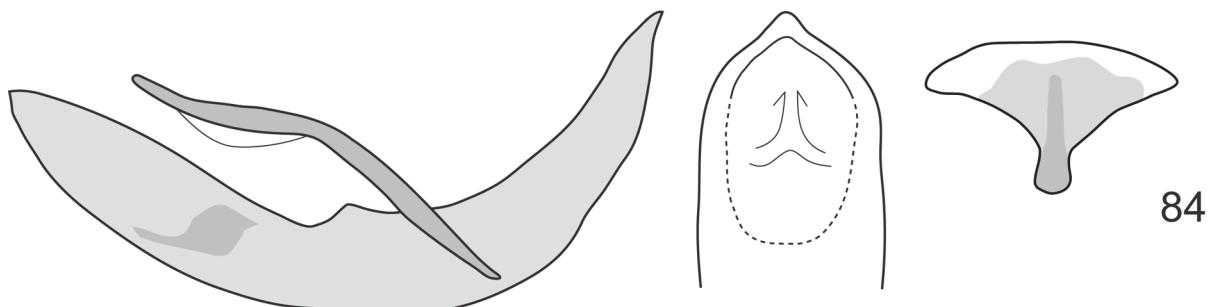
81



82

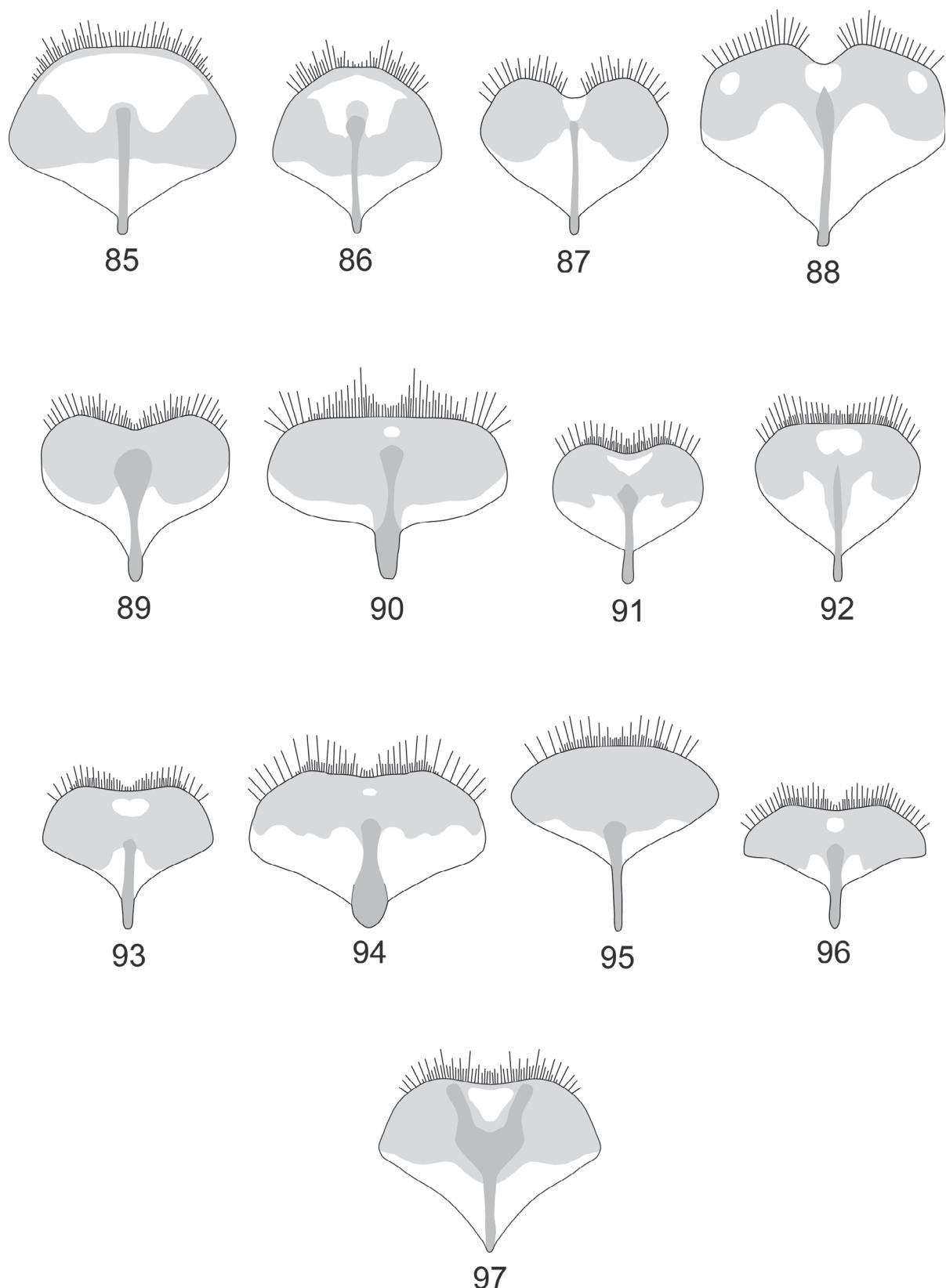


83

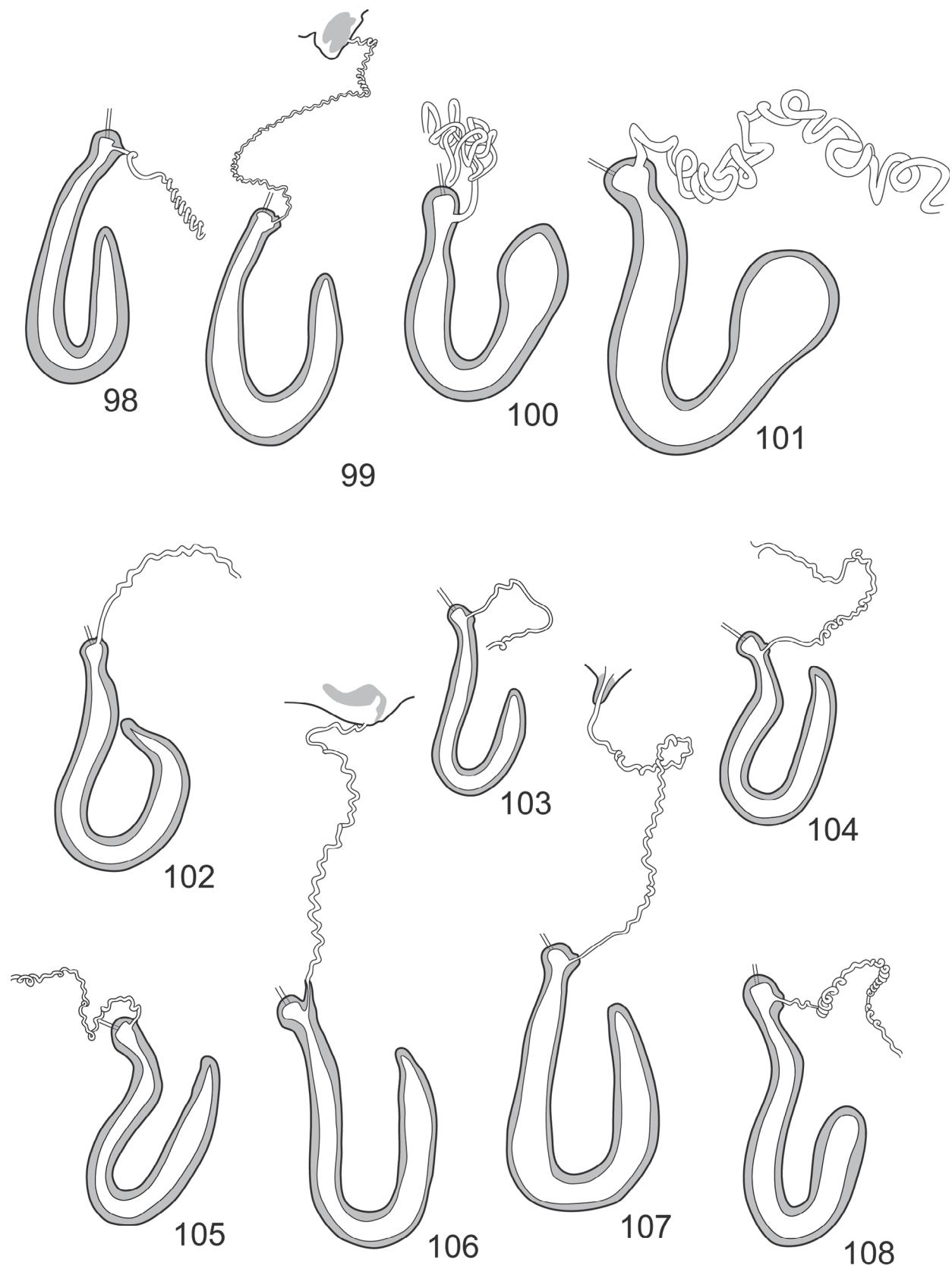


84

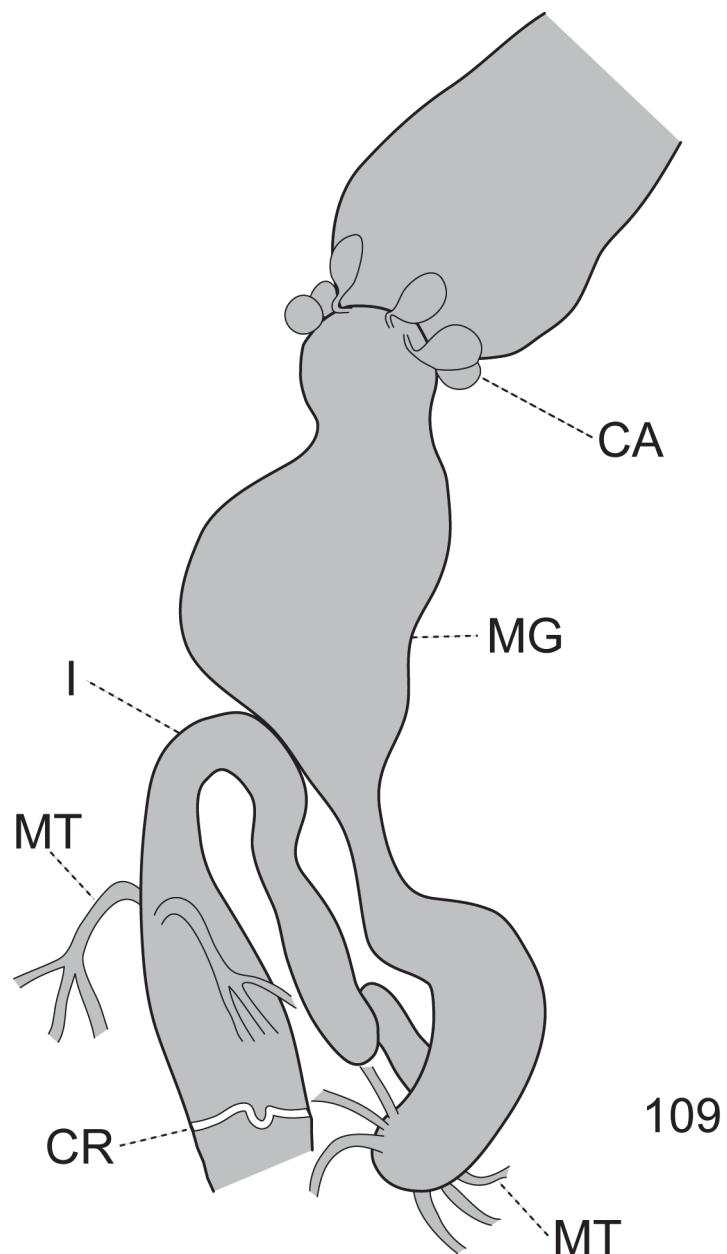
**FIGURES 81–84.** *Spilopyra* species, lateral of penis and tegmen, dorsal of penis apex, dorsal of spiculum relictum: 81, *S. semiramis* sp. nov.; 82, *S. stirlingi* Lea (Mount Lewis); 83, *S. stirlingi* Lea (lectotype, Cairns); 84, *S. sumptuosa* Baly (Tambourine). Shaded area in penis = endophallic sclerites (poorly defined). Drawn to scale.



**FIGURES 85–103.** *Spilopyra* species, female sternite VIII: 85, *S. safrina* sp. nov. (Mount Windsor); 86, *S. safrina* sp. nov. (Cairns); 87, *S. scratchley* sp. nov.; 88, *S. semiramis* sp. nov.; 89, *S. stirlingi* Lea (Mount Lewis); 90, *S. stirlingi* Lea (Mount Carbine); 91, *S. stirlingi* Lea (paralectotype, Cairns); 92, *S. stirlingi* Lea (holotype of *S. flavipennis* Weise, Cedar Creek); 93, *S. stirlingi* Lea (Davies Creek); 94, *S. stirlingi* Lea (Davies Creek); 95, *S. stirlingi* Lea (Mount Bartle-Frere); 96, *S. stirlingi* Lea (Curtain Fig); 97, *S. sumptuosa* Baly. Drawn to scale.



**FIGURES 98–108.** *Spilopyra* species, spermatheca and spermathecal duct: 98, *S. safrina* sp. nov. (Mount Windsor); 99, *S. safrina* sp. nov. (Cairns); 100, *S. scratchley* sp. nov.; 101, *S. semiramis* sp. nov.; 102, *S. stirlingi* Lea (Mount Lewis); 103, *S. stirlingi* Lea (paralectotype, Cairns); 104, *S. stirlingi* Lea (holotype of *S. flavipennis* Weise, Cedar Creek); 105, *S. stirlingi* Lea (Mount Bartle-Frere); 106, *S. stirlingi* Lea (Davies Creek); 107, *S. stirlingi* Lea (Davies Creek); 108, *S. sumptuosa* Baly. Drawn to scale.



**FIGURE 109.** Gross mid- and hindgut morphology of *Spilopyra stirlingi* Lea (female, Curtain Fig). CA = caecum, CR = chitinring, I = ileum, MG = midgut, MT = malpighian tubules (only ends indicated).

#### Key to species of *Spilopyra* Baly

- 1 Each elytral humerus with a large triangular lateral projection (Figs 2–3); base of elytra without metallic stripe; prosternal process bilobed (Figs 44–45) (New Guinea) ..... 2.
- Elytral humeri smoothly rounded (Figs 1, 4–6); base of elytra with short metallic green stripe; prosternal process medially produced (Figs 43, 46–48) (Australia) ..... 3.
- 2(1) Anterior contrasting colour border of pronotum much thinner than posterior (Figs 3, 9); hind angles pronotum more prominent (<90°) and humeral tubercle more prominent (<90°); apex of mesoventrite process more concave than apex of prosternal process (Fig. 45) (central New Guinea) ..... *S. semiramis* sp. nov.
- Anterior and posterior contrasting colour borders of pronotum of similar width (Figs 2, 8); hind angles of pronotum less prominent (90°) and humeral tubercle less prominent (90°); apex of prosternal process more concave than apex of mesoventrite process (Fig. 44) (eastern New Guinea) ..... *S. scratchley* sp. nov.
- 3(1) Each elytron with one complete and one partial transverse contrasting colour band, the partial band not occupying a

depression (Figs 1, 4–5); antennomeres 1–8 red or yellowish-red (Figs 26, 32–42); apex of prosternal process triangular or narrowly rounded (Figs 49, 52–60) (north Queensland) ..... 4.

Each elytron with one complete or virtually complete and two partial transverse or oblique contrasting colour bands bands, the anterior partial band occupying a depression (Fig. 6); antennomeres 7–11 black (Figs 30–31); apex of prosternal process broadly semicircular (Figs 61–62) (sides of ventrites 2–5 entirely keeled; central Queensland to northern New South Wales) ..... *S. sumptuosa* Baly.

4(3) Humeral colour spot not visible from above (Fig. 7); anterior contrasting coloured border of pronotum not greatly expanded at middle; epipleural upper margin present throughout elytral length (Fig. 64); abdominal ventrites 1–4 with sparse erect setae and sides of ventrites 2–5 not keeled (Fig. 77); all antennomeres red (Fig. 26) ..... *S. safrina* sp. nov.

Humeral colour spot visible from above (Figs 13–19); anterior contrasting coloured border of pronotum greatly expanded at middle; epipleural upper margin obliterated below humerus (Fig. 63); abdominal ventrites 1–4 glabrous and sides of ventrites 2–5 keeled (Fig. 78); at least apical antennomere black, middle segments yellowish-red or yellow (Figs 32–42) ..... *S. stirlingi* Lea.

***Spilopyra safrina* sp. nov.**

(Figs 1, 7, 20, 26, 43, 49, 65, 77, 85, 86, 98, 99, 110, 118)

**Material examined.** Holotype: 1♀/ Windsor Tableland via Mt Carbine, malaise trap, 26.xii.1983–24.i.1984, Storey & Halfpapp/ (QDPI); Paratype (1): 1♀/ Cairns/ *Spilopyra stirlingi* Lea Queensland/ (MMS).

**Description [female only].** Length: 10.5–11mm; colour: body dark reddish-brown with metallic reflections, appendages red except tarsomeres 1–3, 5, and extreme apices tibiae metallic green, labrum yellowish-red; metallic reflections on body and elytra distributed as follows: extruded part of head capsule: golden-green, with transverse purple diamond on middle of vertex, almost reaching eyes laterally and not extending to clypeus anteriorly; pronotum: all dorsal margins narrowly golden-green, extended towards disc at middle of base and apex, remainder purple; venter golden-green; scutellum golden-green, mesoventrite golden-green; elytra purple, with short green elongate mark at base of 3<sup>rd</sup>, 4<sup>th</sup> and part of 5<sup>th</sup> intervals, green spot on outer edge of humerus (not visible dorsally), complete transverse green band at middle of basal half, narrowly green suture from this band to elytral apex, transverse green patch at middle of apical half not connected with either suture or epipleuron, green outer edge from near this patch to apex; metaventrite green medially and anteriorly, purple laterally including lateral margins; metepisternum green; abdominal ventrites purple with or without green margins.

Head: punctures generally fine (about equal to eye facets) and sparse (separated by >3 diameters), larger and denser on clypeus, near eyes and at posterior; almost glabrous, but with 3 trichobothria at inner margin of eye, short slightly elevated setae posterior and anterior to eye and short recumbent setae on clypeus; medially broadly depressed between eyes, without groove on midline of vertex; apical margin clypeus shallowly concave; frontoclypeal suture well-defined, with convex base; eyes separated by c. 4 times eye widths; gena c. 0.28 times eye length; antennae c. 3.5 times socket diameters apart; antennae c. 0.55 times body length; antennomeres: 2 shortest (c. 0.6 times first), <6, <1=8, <3=4=5, <7=9=10, 11; antennomeres 7–11 densely setose and broader than sparsely setose thinner 1–6; apical maxillary palpomere elongate, fusiform, length c. 1.3 times preapical.

Thorax: pronotal punctures fine (slightly larger than on middle of head) and sparse (separated by >3 diameters), becoming larger (c. 2 times discal puncture width) and closer (separated by 2–3 diameters) at base; pronotum glabrous, except trichobothrium in each angle and minutely setose lateral margins; pronotal width 1.75 times length, lateral margins evenly convex between prominent, slightly acute angles; pronotal disc almost evenly convex, but with pair of faint depressions either side of midline in basal third; anterior margination incomplete, absent from middle third; hypomeron irregularly wrinkled, not obviously punctured or setose; prosternal process elevated between coxae, punctured and pubescent, approximately quadrate, but with elongate apico-lateral lobes and triangular apical median lobe with rounded apex; scutellum rounded-triangular, with or without 2–3 large punctures; elytra almost glabrous, minute setae present laterally and apically; elytron with deep transverse depression from suture to epipleuron, about 1/3<sup>rd</sup> from base, prominent

humerus between base of 5<sup>th</sup> stria and small depression at epipleuron; striae punctures large and deep at base (similar to pronotal base), evanescent from middle to apex; elytra striate, with 9 distinct striae and sutural stria; large punctures present in transverse depression (especially at sides) and in basal half between 1<sup>st</sup> and 2<sup>nd</sup> striae and 7<sup>th</sup> and 8<sup>th</sup> striae, smaller punctures present between 9<sup>th</sup> stria and epipleuron; upper margin epipleuron complete to base of elytron, continuing along basal edge; mesoventrite median process transverse, strongly arched to slightly concave apical margin, with shallow median depression; metaventrite shining, minutely and sparsely punctured and pubescent; metaventrite anterior lobe deeply depressed, without margination, remainder of anterior border simply margined, without crenulation or pitting; metepisternum shining and impunctate or almost so; hind femur smooth and sparsely punctured; all tibiae slightly swollen in apical half, metatibia with preapical long setae on inner face; tibiae smooth, sparsely and finely punctured, without keels; second metatarsomere transverse.

Abdomen: ventrites I–V with 3–6 pairs of long setae near midline, and minute sparse recumbent setae, denser on ventrites IV–V; ventrite I with basal lateral keel, 1/3–1/2 length ventrite at middle, remaining ventrites without keels; apex ventrite V rounded; apex sternite VIII rounded or narrowly truncate, base with small quadrate apodeme; spermatheca U-shaped with relatively pointed apex, slightly bent towards duct, which is loosely coiled.

**Note.** Etymology: a noun in apposition, named for Safrina Thristiawati, partner of CAMR.

*Spilopyra safrina* is known from 2 specimens, one of which has a printed locality label ‘Cairns’ and the same information written separately in Lea’s handwriting (CAMR, *pers. obs.*). This appears to be a specimen collected by Lea, who used the appellations ‘Cairns’ and ‘Cairns dist.’ for material collected within at least 100km of Cairns. The other specimen was collected from Windsor Tableland, 100km from Cairns, a large block of forest west of the Mount Carbine-Mount Lewis plateau, and generally sharing its flora and fauna with that region (Yeates, Bouchard & Monteith 2002). It is therefore possible that *S. safrina* is endemic to this biogeographic area.

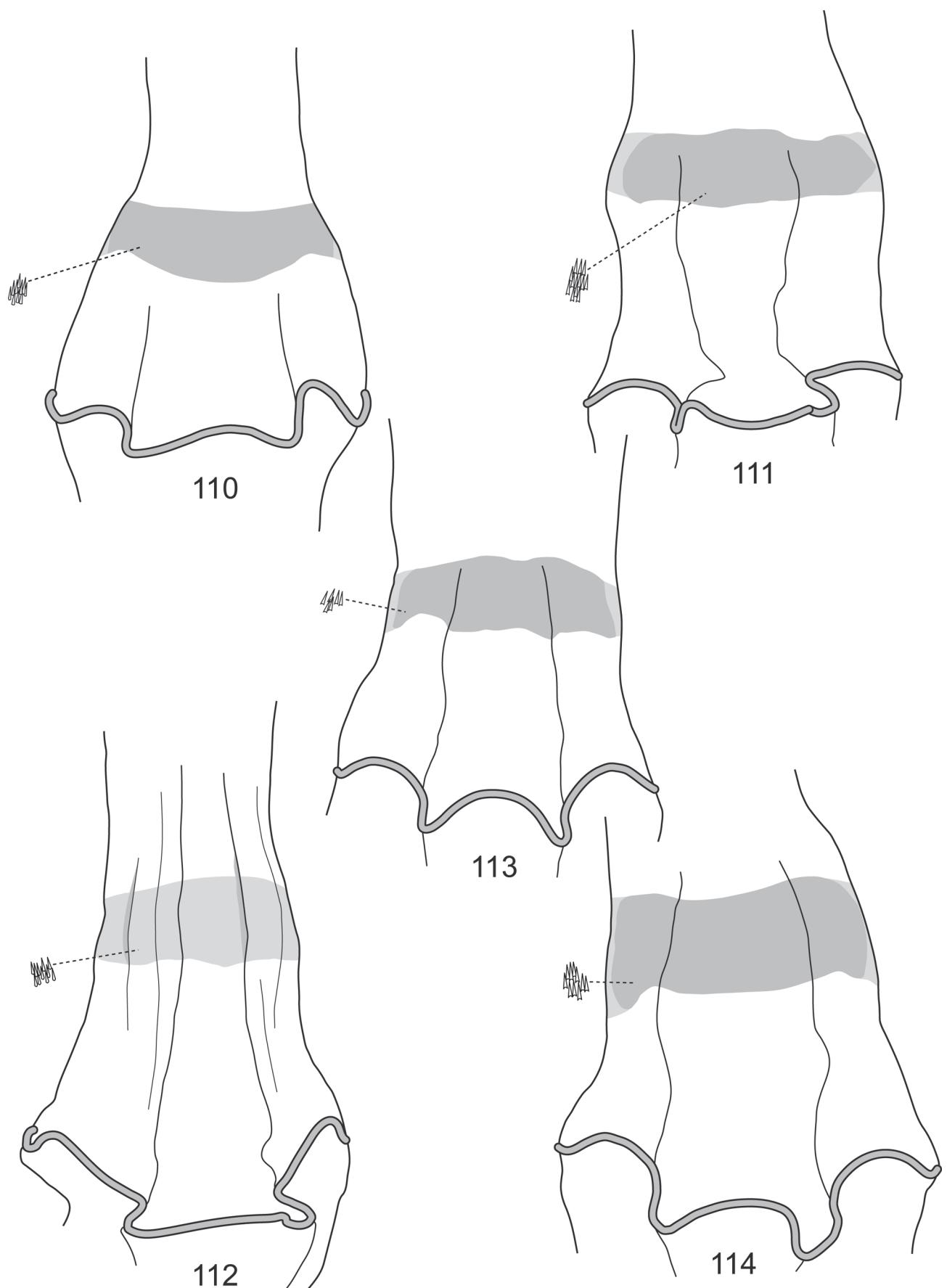
### *Spilopyra scratchley* sp. nov.

(Figs 2, 8, 21, 27, 44, 50, 66, 87, 100, 111, 118)

**Material examined.** Holotype: 1♀/ Neneba, Mount Scratchley [Papua New Guinea, approximately 8:43S 147:28E], 4–5000', xi.1896, A. Giulianetti (QMB).

**Description** [female only, antennomeres 4–11 missing]. Length: 10mm. Body dark reddish-brown with metallic reflections, appendages red except tarsomeres 1–3, 5, and extreme apices tibiae metallic purplish-blue, labrum yellowish-red. Metallic reflections on body and elytra distributed as follows: extruded part of head capsule: golden-green, with purple diamond on middle of vertex, distant from eyes laterally and not extending to clypeus anteriorly; thorax: pronotum: all dorsal margins broadly golden-green, not extended towards disc at middle of base and apex, remainder purple; venter feebly metallic; scutellum golden-green, mesoventrite feebly metallic; elytra purple, with complete transverse green band at middle of basal half, transverse green patch at middle of apical half not connected with either suture or epipleuron, broadly green sutural stripe from this patch to elytral apex, green outer elytral edge from near this patch to apex; metaventrite feebly metallic, green, lateral and posterior margins purple; metepisternum purple; abdominal ventrites feebly metallic purple.

Head: punctures minute (smaller than eye facets) and sparse (separated by >3 diameters), larger (diameter greater than eye facet) and denser on between eyes and at posterior; almost glabrous, but with 3 trichobothria at inner margin of eye, short slightly elevated setae posterior and anterior to eye and short recumbent setae on clypeus; inner margin of eye smooth, ungrooved; medially not depressed between eyes, except base of clypeus, without groove on midline of vertex; apical margin clypeus deeply concave; frontoclypeal suture effaced at middle, sides deeply grooved; eyes separated by c. 5 times eye widths; gena c. 0.28 times eye length; antennae c. 5 times socket diameters apart; antennomere 2 c. 0.8 times first, 2<3<1; apical maxillary palpomere elongate, fusiform, length c. 1.3 times preapical.



**FIGURES 110–114.** Kotpresse of *Spilopyra* species (dorsal view, anus at top): 110, *S. safrina* sp. nov.; 111, *S. scratchley* sp. nov.; 112, *S. semiramis* sp. nov.; 113, *S. stirlingi* Lea; 114, *S. sumptuosa* Baly. Drawn to scale.

Thorax: pronotal punctures fine (larger than on middle of head) and sparse (generally separated by >3 diameters), becoming larger (c. 2 times discal puncture width) at base; apparently glabrous, except trichobothrium in each angle (seta broken off); pronotal width 1.7 times length, lateral margins slightly sinuate between prominent, slightly acute anterior angles and 90° posterior angles; pronotal disc almost evenly convex, but with faint lateral median depressions; anterior margination incomplete, absent from middle third; hypomeron smooth, not obviously punctured or setose; prosternal process slightly elevated between coxae, almost impunctate and glabrous, approximately quadrate, but with elongate apico-lateral lobes and two short and rounded apical median lobes (apex bilobed); scutellum rounded-triangular, smooth and impunctate; elytra apparently glabrous; elytron with deep transverse depression from suture to epipleuron, about 1/3<sup>rd</sup> from base, prominently angular humerus projecting laterally from between base of 5<sup>th</sup> stria and epipleuron, apical angle c. 90°; striae punctures large and deep throughout (similar to pronotal base), larger in and beyond transverse depression; elytra striate, with 9 distinct striae and sutural stria; striae partly confused by large punctures present in transverse depression (especially at sides), in basal half between 1<sup>st</sup> and 2<sup>nd</sup> striae and 7<sup>th</sup> and 8<sup>th</sup> striae, and between 9<sup>th</sup> stria and epipleuron; upper margin epipleuron incomplete, not reaching base of elytron at humerus; mesoventrite median process transverse, strongly arched to strongly concave apical margin, with shallow lateral depressions; metaventrete shining, minutely and sparsely punctured and pubescent; metaventrete anterior lobe shallowly depressed, without margination, remainder of anterior border simply margined, without crenulation or pitting; metepisternum shining and impunctate or almost so; hind femora smooth and sparsely punctured; tibiae not swollen in apical half, metatibia without preapical long setae on inner face; tibiae smooth, finely and sparsely punctured, without keels; second metatarsomere elongate.

Abdomen: ventrites I–V with 1–3 pairs of long setae near midline, and minute sparse recumbent setae, denser on ventrites IV–V; ventrite I with basal lateral keel, 2/3 length ventrite at middle, remaining ventrites without keels; apex ventrite V rounded; apex female sternite VIII deeply concave, base with short elongate apodeme; spermatheca U-shaped with swollen but slightly pointed apex, duct densely but irregularly coiled.

**Notes.** Etymology: named from the type locality, as a noun in apposition.

*Spilopyra scratchleyi* is known from a single specimen collected in the eastern highlands of New Guinea. The collector, Julianetti, was in Neneba, Adjibara River, from 1–9 November (van Steenis-Kruseman 1950). We have been unable to locate these names on a map, but the height (1300–1600m) and Julianetti's subsequent journey indicate that Neneba was in an upper valley of one of the rivers flowing southwest from Mount Scratchley.

### *Spilopyra semiramis* sp. nov.

(Figs 3, 9, 22, 28, 29, 45, 51, 67, 81, 88, 101, 112, 118)

**Material examined.** Holotype: ♂/ Kmu [Karimui, Papua New Guinea, 6:30S 144:50E, 982m], vii.1975, H. Ohlmu (ANIC); Paratypes (3): ♂, 2♀, same data as holotype (AMS, ANIC).

**Description.** Length: 12–13mm. Body dark reddish-brown with metallic reflections, appendages red except tarsomeres 1–3, 5, and extreme apices tibiae metallic purplish-blue, femora greenish, apex labrum yellowish-red, antennomeres 5–11 black, 4 darker than 1–3, which are medially darkened. Metallic reflections on body and elytra distributed as follows: extruded part of head capsule: golden-green, with purple transverse-oval patch on middle of vertex, close to eyes laterally and not extending to clypeus anteriorly; thorax: pronotum: all dorsal margins golden-green, broad at base, not extended towards disc at middle of base and apex, remainder purple; venter green; scutellum golden-green, mesoventrite green; elytra purple, with transverse green band at middle of basal half from epipleuron almost to suture, transverse green patch at middle of apical half connected to epipleuron, broadly green sutural stripe from anterior of this patch to elytral apex, green outer elytral edge from patch to apex; metaventrete green, with purple lateral and posterior margins; metepisternum purple; abdominal ventrites feebly metallic purple.

Head: punctures generally small (diameter similar to eye facets), close (separated by 1–4 diameters) and slightly strigose, but on clypeus and between and behind eyes larger (diameter much greater than eye facet)

and denser; almost glabrous, but with 3–4 trichobothria in groove at inner margin of eye, minute recumbent setae on clypeus; medially depressed between eyes, without groove on midline of vertex; apical margin clypeus deeply concave; frontoclypeal suture effaced at middle, sides deeply grooved; eyes separated by c. 4.5 times (male) or c. 4.8 times (female) eye widths; gena c. 0.3 times eye length; antennae c. 4.7 times socket diameters apart; antennae 0.5–0.6 times body length; antennomere 2 shortest (c. 0.65 times first),  $<1=6=8$ ,  $<3=9=10$ ,  $<4=7=11$ ; antennomeres 7–11 densely setose and broader than sparsely setose thinner 1–6; apical maxillary palpomere elongate, fusiform in both sexes, length about equal to preapical.

Thorax: pronotal punctures mostly large (twice diameter of middle of head) and close (generally separated by 1–3 diameters), becoming larger (c. 2 times discal puncture width) at base & sides; apparently glabrous, except trichobothrium in each angle; pronotal width 1.5 times length, lateral margins slightly sinuate between prominent, distinctly acute angles; pronotal disc almost evenly convex, but with faint lateral median depressions; anterior margination incomplete, absent from middle third to half; hypomeron mostly smooth, laterally wrinkled in basal half, not obviously punctured or setose; prosternal process slightly elevated between coxae, almost impunctate and glabrous, approximately quadrate, but with elongate apico-lateral lobes and two short and rounded apical median lobes (apex bilobed); scutellum semi-ovate, with small basal punctures or finely strigose; elytra apparently glabrous; elytron with deep transverse depression from epipleuron almost to suture, about 1/3<sup>rd</sup> from base, prominently angular humerus projecting laterally from between base of 5<sup>th</sup> stria and epipleuron, apical angle c. 75°; striae punctures large and deep at middle (similar to pronotal base), larger in and just beyond transverse depression, shallower at base, evanescent at apex; elytra semi-striate, with 5–6 distinct striae and sutural stria, but outer striae partly confused by large interstriae punctures; upper margin epipleuron complete to base of elytron at humerus, but not continued to basal elytral edge; mesoventrite median process transverse, strongly arched to strongly concave apical margin, without lateral depressions; metaventrite shining, minutely and sparsely punctured and pubescent; metaventrite anterior lobe not or shallowly depressed, without margination, remainder of anterior border simply margined, without crenulation or pitting; metepisternum shining and impunctate or almost so; hind femur smooth, finely and sparsely punctured; tibiae not swollen in apical half, protibia with preapical ventral brush of dense setae (long & short), metatibia with a few preapical ventral long setae; tibiae smooth, finely and sparsely punctured, without keels; second metatarsomere roughly equilateral triangular.

Abdomen: ventrites I–V with 1–2 pairs of long setae near midline, and minute sparse recumbent setae, slightly denser on ventrites IV–V; ventrite I with basal lateral keel, 4/5 length ventrite at middle, remaining ventrites without keels; apex ventrite V truncate in male, rounded in female; spiculum relictum broadly concave, with broad basal apodeme; penis apex almost right-angled in dorsal view, acute and slightly reflexed in lateral view; ostium of penis with strongly exerted paired narrow valves; tegmen Y-shaped, broad stem contracted to truncate base, internal keel basal only, prominent and evenly convex; endophallic sclerite trilobed; apex female sternite VIII deeply concave, base with small apodeme; spermatheca falcate but apex swollen and globular, duct irregularly but strongly coiled.

**Notes.** Etymology: named for legendary queen and beauty Semiramis (Lane Fox 2008), a noun in apposition.

*Spilopyra semiramis* is known from a single collection event. The placename Kmu does not exist, but was the collector's shorthand for Karimui in the central highlands of New Guinea.

#### *Spilopyra stirlingi* Lea, 1914

(Figs 4, 5, 10, 13–19, 23, 24, 32–42, 46, 47, 52–60, 63, 68–75, 78, 81–83, 89–96, 102–107, 109, 113, 119)

*Spilopyra stirlingi* Lea, 1914: 344

*Spilopyra flavicornis* Weise, 1923: 28 (syn. nov.)

**Material examined.** Types: *Spilopyra stirlingi*: Lectotype (this designation): 1♂/ *stirlingi* Lea Cairns type/ (SAM); Paralectotype (1): 1♀/ Cairns dist., A. M. Lea/ cotype/ (SAM). *Spilopyra flavicornis*: holotype (by monotypy): 1♀/ Cedar Creek/ Queensl. Mjöberg/ type/ typus/ *Spilopyra flavicornis* m./ (NHRS).

Non-types (13): **Queensland**: 1♂/ Curtain Fig, 17:17S 145:34E, rainforest by tower, on *Arytera divaricata*, c800m, xii.1994, C. Reid (ANIC); 1♀/ Davies Ck, iii.1964, I. C. Cunningham (UQB); 1♀/ Davies Creek, via Mareeba, rainforest, 12.vi.1980, G. B. Monteith (QMB); 1♂/ Herberton, 19.iii.1922 (UQB); 1♂/ 17:17S 145:38E Lake Eacham NP, 11.ii.1998, T. Weir, at light (ANIC); 1♀/ Mount Bartle-Frere, ii.1984, B. Gray (DPIM); 1♂, 2♀/ North Queensland (AMS, UQB); 1♀/ Mount Carbine, T. W. Gamble (AMS); 1♂/ Mount Lewis, 3.ii.1988 (AMS); 1♀, ditto, 6.i.1991, J. Hasenpusch (QMB); 1♂, ditto, c16:31S 145:16E, on *Homalanthus*, 23.xii.1995 (QMB).

**Description.** Length: 8–12mm (male), 9–12mm (female). Body dark reddish-brown with metallic reflections, appendages red except tarsomeres (apex 5 excepted) and apices femora, tibiae metallic green, and labrum, palpi and antennomeres 1–8 yellowish-red, antennomere 11 black, 9 and 10 often also black at least apically, 7 sometimes darkened. Metallic reflections on body and elytra distributed as follows: extruded part of head capsule: golden-green, with transverse purple diamond or blotch on middle of vertex, usually distant from eyes laterally, sometimes narrowly extending to clypeus anteriorly; thorax: pronotum: all dorsal margins golden-green, strongly extended towards disc at middle of apex, less so at middle of base, remainder purple; prothoracic venter golden-green; scutellum golden-green, mesoventrite golden-green; elytra purple, with green elongate mark at base of 3<sup>rd</sup> and 4<sup>th</sup> intervals, green spot on humerus (visible dorsally), complete transverse green band at middle of basal half, narrowly green suture from this band to elytral apex, transverse green patch at middle of apical half connected to epipleuron, green outer edge from this patch, or nearby, to apex; metaventrite green medially and anteriorly, with purple lateral triangle; metepisternum green at base and apex, purple in middle or entirely purple; abdominal ventrite I and usually II–III purple with green margins, remainder green.

Head: punctures variable, from minute (smaller than eye facets) and sparse (separated by >5 diameters), to large (larger than eye facets) and moderately close (separated by 3–5 diameters), larger and denser on clypeus, near eyes and at posterior; almost glabrous, but with 3–6 trichobothria in a groove at inner margin of eye, short recumbent setae posterior and anterior to eye; medially narrowly depressed along midline between eyes, including anterior vertex; apical margin clypeus shallowly concave; frontoclypeal suture well-defined, with grooved convex base; eyes separated by 4–4.5 times eye widths; gena 0.2–0.25 times eye length; antennae c. 4 times socket diameters apart; antennae 0.6–0.67 times body length; antennomere 2 shortest (c. 0.55 times first), <6 or <3=6, <4=8 or 3=4=8, <5, <1=7 or 1=5=7, <9, <10, <11 (1.3–1.4 times 10); antennomeres 7–11 densely setose and broader than sparsely setose 1–6, 3–6 broader in larger individuals; apical maxillary palpomere elongate and fusiform, or cylindrical in large males, length c. 1.3 times preapical.

Thorax: pronotal punctures variable on disc, from fine (slightly larger than on middle of head) and sparse (separated by >5 diameters), to large (much larger than on head) and close (separated by 2–4 diameters) but with scattered fine punctures between; punctures larger (2–3 times discal puncture widths) and closer (separated by 1–3 diameters) at base and sides; glabrous, except trichobothrium in each angle; pronotal width 1.5 times length, lateral margins shallowly convex between prominent, distinctly acute angles, anterior edge medially concave; pronotal disc evenly convex; anterior margination complete to narrowly incomplete, absent from middle fifth; hypomeron smooth, slightly wrinkled in anterior half, not obviously punctured or setose; prosternal process elevated between coxae, punctured and pubescent, approximately quadrate, but with elongate apico-lateral lobes and semi-ovate apical median lobe; scutellum semi-ovate to trapezoidal, impunctate to strongly but sparsely punctured at sides or base; elytra glabrous; elytron with deep transverse depression from suture to epipleuron, about 1/3<sup>rd</sup> from base, prominent rounded humerus between base of 5<sup>th</sup> stria and epipleuron; striae punctures small and shallow at base or larger and deeper in large specimens (similar to pronotal disc), large and deep in transverse depression, evanescent in apical quarter; elytra striate, with 6–9 distinct striae and sutural stria, scattered large punctures present in basal half outer intervals sometimes obscuring striae 7–9; upper margin epipleuron incomplete to base of elytron, effaced between transverse depression and base; mesoventrite median process punctured and pubescent, transverse, strongly arched to slightly concave apical margin, with deep median depression; metaventrite shining, sparsely pubescent and smooth or shallowly transversely strigose at sides; metaventrite anterior lobe deeply depressed, remainder of anterior border margined with crenulation or pitting; metepisternum shining and impunctate or

almost so; femora preapically strongly punctured and strigose, more so in larger specimens; protibia slightly curved and elongated compared with mid tibia in some males, with dense setal brush; metatibia with preapical long setae on inner face; tibiae smooth and minutely punctured in small specimens, strongly punctured in large specimens, without keels; second metatarsomere approximately equilateral triangular.

Abdomen: ventrites I–IV glabrous, without long setae near midline; ventrite V of male densely punctured and pubescent in apical half, less so in female; ventrites I–V with complete lateral keels; apex ventrite V truncate (male) or shallowly convex (female); spiculum relictum transverse, apex broadly concave, basal apodeme narrow and elongate; penis with short 90° mucronate tip in dorsal view, acute and slightly reflexed in lateral view; ostium of penis with slightly exerted paired triangular valves; tegmen Y-shaped, broad stem narrowed to truncate base, internal keel shallow but present throughout length except base; endophallic sclerite weakly sclerotised, trilobed; apex female sternite VIII truncate to shallowly concave, basal apodeme prominent but variable in length and width; spermatheca falcate to U-shaped, but glandular insertion always angled away from main axis of spermatheca, apex narrowed, spermathecal duct loosely coiled duct.

**Notes.** The description provided above applies to 16 specimens of *Spilopyra* from the Wet Tropics of north Queensland. In this sample males are generally not associated with females and the detailed localities lie in four known areas of endemicity in the rainforests of north Queensland: Carbine Uplands, Lamb Uplands, Atherton Uplands and Bellenden Ker/Bartle Frere Uplands (Yeates *et al.* 2002). The specimens show slightly different combinations of size, colour pattern, surface sculpture, penis size and spermathecal shape. At first we considered the possibility that several species were represented in this material. However, there is no obvious correlation between (a) variation in colour, especially antennae (Figs 32–42), shape of frontal contrasting colour patch (Figs 13–19), distribution of colour on metepisternum (Figs 68–75), and (b) variation in structure, especially anterior pronotal margination (Figs 13–19, size of pronotal punctures, prominence of elytral striae, (Figs 4–5), size of penis (Figs 82–83), shape of female sternite 8 (Figs 89–96), shape of spermatheca (Figs 102–107). Morphological variation of these structures, for example female genitalia, is present within single populations (Figs 93–94, 106–107). Overall, the morphological variation seems to be gradual rather than discrete. Larger specimens have proportionately larger antennae with more extensive darkening of the apical antennomeres (Figs 33, 34, 36, 37) and are more strongly punctured. This pattern does not appear to be associated with any particular biogeographic region. In the absence of any clear corroborative pattern of variation to subdivide this limited amount of material, we treat the whole group as a single variable species. This pragmatic solution is also parsimonious with biological and biogeographical data; the specimens are volant, unlike organisms used for the testing of areas of endemicity in the Wet Tropics (Yeates *et al.* 2002), and their probable hosts in Sapindaceae are common and widespread throughout the Wet Tropics region and not restricted to rainforest refugia (Hyland & Whiffin 1993).

Two species names are available for these specimens. One of these, *Spilopyra stirlingi*, is based on two syntypes. We designate the male as lectotype, to fix the identity of this species amongst its similar cogeners. The lectotype of *S. stirlingi* is a small male (length 8mm; Figs 13, 32, 54, 70, 78) and the holotype of *S. flavicornis* is a larger female (10mm; Figs 14, 42, 60, 71). Otherwise the two specimens are almost identical and these species are clearly synonymous (*S. stirlingi* Lea, 1914 = *S. flavicornis* Weise, 1923, **syn. nov.**). Weise made no mention of Lea's work in his description of *S. flavicornis*, comparing it only with *S. sumptuosa*.

Weise's species was described from a specimen collected by Mjöberg at Cedar Creek in 1913. At present there are two 'Cedar Creeks' in north Queensland (<http://www.ga.gov.au/map/names/>) but surprisingly neither is the Cedar Creek of Mjöberg, which can be identified from his diaries as the Ravenshoe area, southwest Atherton Tableland (Ferrier 2006).

*Spilopyra stirlingi* has been collected from December to April. CAMR collected a single specimen in December 1994 on *Arytera* bushes at Curtain Fig and made three further visits at various times but failed to find more material. *Arytera* may not be the host plant, although it belongs to the genus group of Sapindaceae which provides hosts for *S. sumptuosa* (q.v.). We suspect the record on *Homalanthus*, in unrelated family Euphorbiaceae, is unlikely to be a host.

***Spilopyra sumptuosa* Baly, 1860**

(Figs 6, 11, 12, 25, 30, 31, 48, 61, 62, 64, 76, 84, 97, 108, 114–117, 119)

*Spilopyra sumptuosa* Baly, 1860: 25

**Material examined.** Types: Lectotype (this designation): male / M. B./ type/ *Spilopyra sumptuosa* Baly Moreton Bay/ Baly coll/ *Spilopyra sumptuosa* Baly Moreton Bay/ coll Diggles Stevens [on reverse of previous label]/ (BMNH); Paralectotype: / Australia Moreton Bay/ type de Baly/ ex Musaeo Lefèvre/ (MHNP).

Non-types (142): **Australia:** 11/ no data label (AMS, ANIC, SAM); 1, ditto, Baly (BMNH); 1, ditto, Dodd (QDPIM); **New South Wales:** 1, no data (SAM); 2, ditto, A. H. Elston (AMS); 1/ Boatharbour NR, NE Lismore, ex foliage, rainfor. remnant, 16.xi.1988, G. Williams (AMS); 1, ditto, 16.xii.1988 (AMS); 1/ Broken Head NR, S Byron Bay, ex rainforest foliage, 17.xi.1988, G. Williams (AMS); 2/ Macphersons Range, Deane (AMS); 1/ Mount Warning, nr Murwillumbah, 26.xii.1975, G. Daniels (AMS); 1/ Nightcap Rge, 11.xii.1976, E. Fricke (AMS); 2/ N Rio, Griffith (SAM); 5/ Richmond R (SAM); 2/ Tweed R, Lea (SAM); 2, ditto, C. Gibbons (AMS); 1, ditto, 1903, Froggatt (ANIC); 1/ Wilson's Ck, nr Lismore, 2.ii.1961, C. W. Frazier (ANIC); 1/ Wilson NR, Lismore, on foliage ex dry rainforest, 17.xii.1998, G & B Williams (AMS); **Queensland:** 7, no data (AMS, SAM); 1, ditto, Macleay (ANIC); 1, ditto, E. W. Ferguson (ANIC); 1/ Beenleigh, 25.v.1924, E. Sutton (QMB); 3/ Brisbane, Illidge (AMS); 1/ Coolangatta, iii.1916, H. A. Longman (QMB); 4/ Eagle Hts, edge rainforest, 23.iii.1955, M. B. Wilson (QMB); 3, ditto, open country, S. B. Gunn (QMB); 2/ Fletcher, E. Sutton (ANIC); 1/ Glen Aplin, 1948, A. Gemmell (ANIC); 2/ Gympie (SAM); 1/ Lamington, 11.xi.1943, A. Blombery (AMS); 1/ Lower Beechmont, 1-4.i.1982, G. J. & A. Holloway (AMS); 1/ Mackay (SAM); 2/ Maleny, x.1929, H. Hacker (QMB); 1/ Mount Glorious, 22km NW Brisbane, rainforest, 635m, 13.iii.1979, A. Hiller (QMB); 1/ Mount Tambourine, 4.xi.1911 (QMB); 1, ditto, 28.xi.1925, E. Sutton (QMB); 2, ditto, 19.xii.1925, A. Musgrave & G. P. Whitley (AMS); 2, ditto, 24.xii.1925 (AMS); 2, ditto, 2.i.1956, C. King (AMS, ANIC); 1, ditto, 26.ii.1960, C. W. Frazier (ANIC); 1, ditto, 2.i.1956, C. King, ex A. N. Burns coll. (ANIC); 2/ [Lamington] National Pk, xii.1919, H. Hacker (QMB); 2, ditto, xi.1920 (AMS, QMB); 2, ditto, xii.1923 (QMB); 1, ditto, 23.x.1923 (QMB); 2, ditto, Macpherson Ra, i.1928, H. J. Carter (ANIC); 1/ M[oreton] B[ay], Baly (BMNH); 1/ St. Bernard, Mount Tambourine, 1.i.1962, C. W. Frazier (ANIC); 1/ Tambourine, 23.i.1926, E. Sutton (QMB); 1, ditto, vi.1928 (QMB); 1, ditto, xi.1935, B. Stagles (ANIC); 1/ Tambourine Mountain (AMS); 27, ditto, H. Brown (AMS); 4, ditto, W. H. Davidson (ANIC, QMB); 6, ditto, E. Fricke (AMS); 7, ditto, S. R. E. Brock (ANIC); 3, ditto, E. Sutton (ANIC, QMB); 1, ditto, i.1907, H. J. Carter (AMS); 1, ditto, 28.x.1912, H. Hacker (QMB); 2, ditto, 28.xi.1911 (QMB); 1/ Tamborine NP, Palm Grove section, Curtis Rd entrance, 27:55S 153:12E, beating rf veg, *Mischocarpus pyriformis*, 530m, 8.xii.2007, C. Reid (AMS); 2/ Upper Tallebudgera Valley, Queensland, 28° 12'S 153° 21'E, with eggs & larvae, on *Guioa semiglauca*, 10-20.i.2000, D. Cook (QMB); 4/ Wide Bay (AMS); 2, ditto, Masters (AMS).

**Larvae:** 3 first instars, Upper Tallebudgera Valley, Queensland, 28° 12'S 153° 21'E, ex eggs laid on *Guioa semiglauca*, D. Cook, 10–20.i.2000 (AMS [additional material in QMB]); 1 first instar/ Big Scrub, Nightcap NP, loop walk, Gibbergunya Range Rd, 28:38S 153:19E, 180m, beating rainforest trees/shrubs, 1.iii.2002, C. Reid (AMS).

**Description.** Length: 9.5–12mm. Body dark reddish-brown with metallic reflections, appendages red except tarsomeres (4 and apex 5 excepted) and apices femora, tibiae metallic green, and labrum, palpi and basal antennomeres red, antennomeres 6–11 apically darkened, 9–11 black or almost so; tarsomere 5 often purplish-black and 4 sometimes dorsally metallic. Metallic reflections on body and elytra distributed as follows (NB in this species areas of contrasting colour are diffuse, not clearly defined): extruded part of head capsule: golden-green, with transverse purple blotch on vertex almost to eyes, broadly extending to clypeus anteriorly; thorax: pronotum: all dorsal margins golden-green, strongly extended towards disc at middle of apex, less so at middle of base, remainder purple; prothoracic venter golden-green and purple; scutellum golden-green, mesoventrite golden-green; elytra purple, with green elongate mark at base of 3<sup>rd</sup> interval, crossing 4<sup>th</sup> basally, small green spot at side of humerus and on epipleuron (not visible dorsally), complete

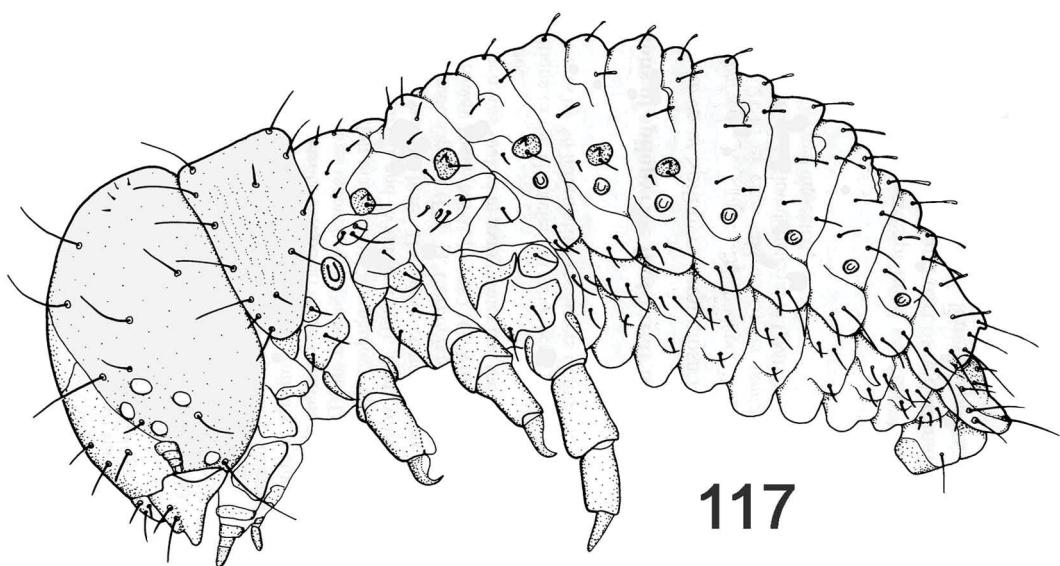
transverse green band at middle of basal half or band not quite touching suture, narrowly green suture from this band to elytral apex, transverse green patch at middle of elytron connected to epipleuron, oblique green patch in apical elytral third from epipleuron almost to suture; metaventrite green medially and anteriorly, with purple lateral triangle; metepisternum green; abdominal ventrites usually with lateral margins green, I purple with green base, II and V golden green, III and IV purplish-blue, or rarely all ventrites purplish-blue.



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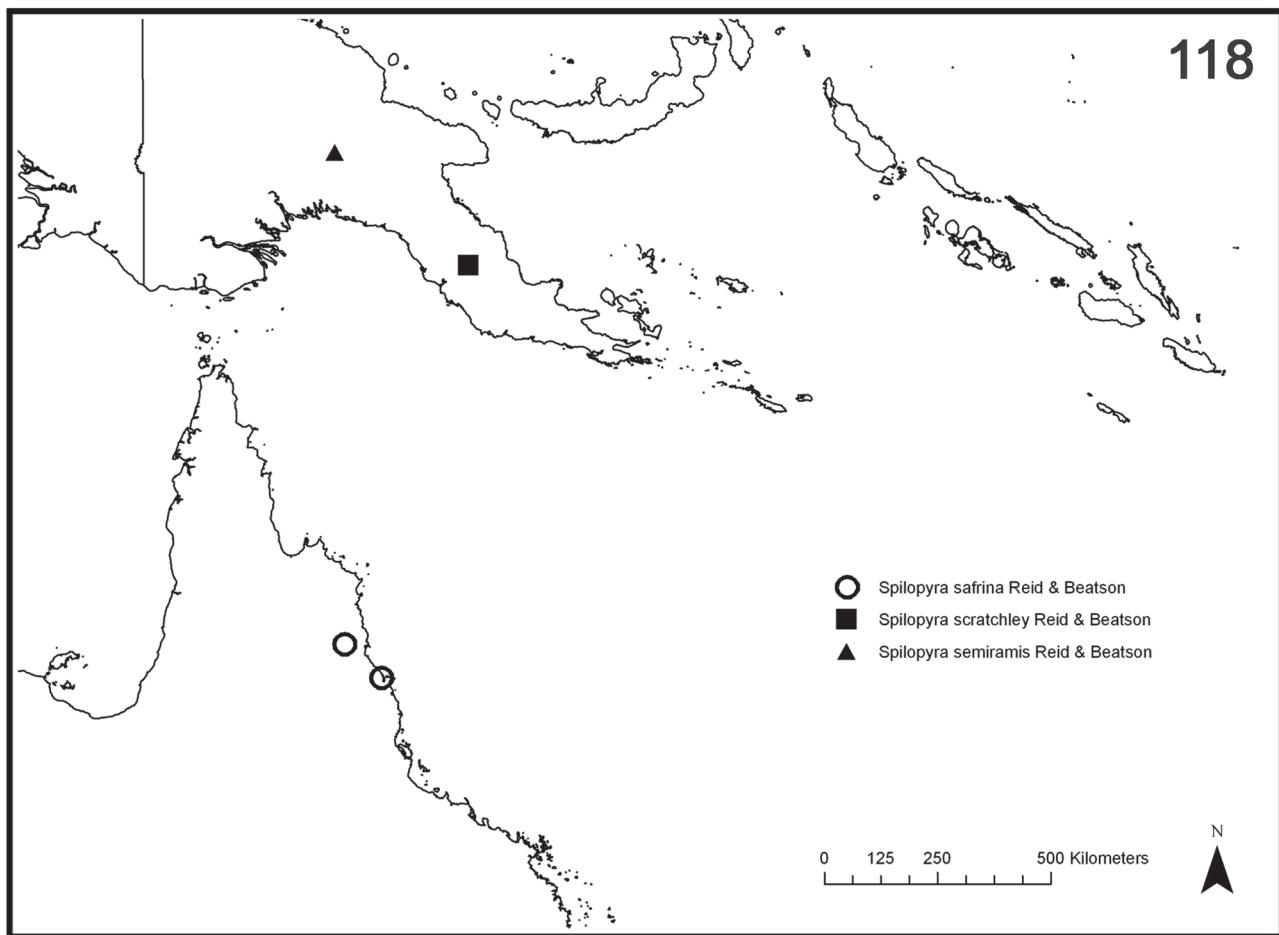


116



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**FIGURES 115–117.** *Spilopyra sumptuosa* Baly, immature stages: 115, egg ‘case’ dorsal, on leaf; 116, egg case ventral; 117, first instar larva (reproduced, with permission, from *Invertebrate Taxonomy* 14: 840, figure 2).



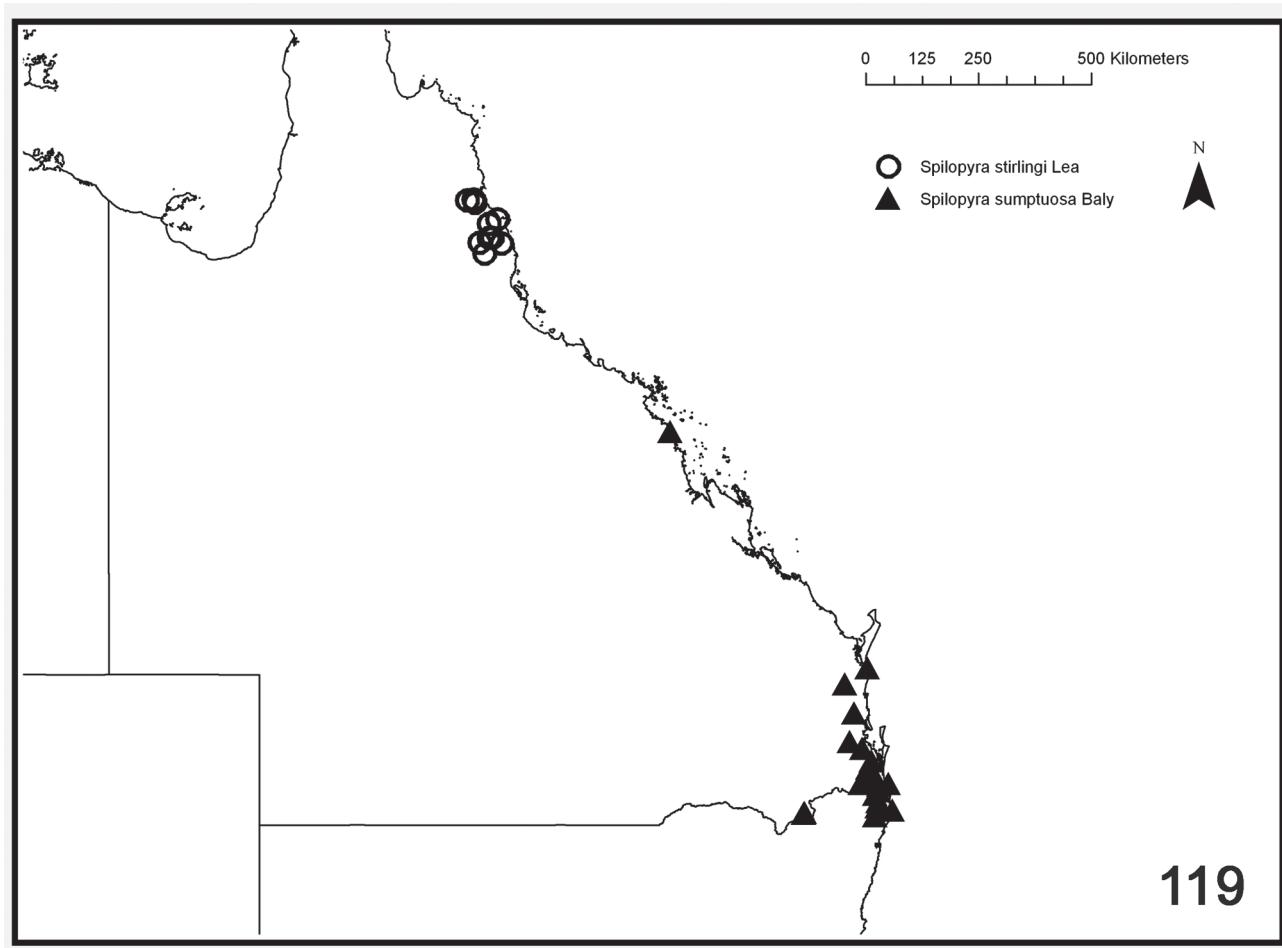
**FIGURE 118.** Map of north-east Australia and Papua New Guinea, showing distribution of: ○ = *Spilopyra safrina* sp. nov.; ■ = *S. scratchleyi* sp. nov.; ▲ = *S. semiramis* sp. nov.

Head: punctures variable, from small (about equal to eye facets) and sparse (separated by 3–5 diameters), to large (slightly larger than eye facets) and moderately close (separated by 2–3 diameters), larger and denser on clypeus, between middle of eyes and at posterior; almost glabrous, but with 3–6 trichobothria in a groove at inner margin of eye, short recumbent setae posterior and anterior to eye; medially shallowly and broadly depressed along midline between eyes, usually deeply and narrowly depressed on anterior of vertex; apical margin clypeus shallowly concave; frontoclypeal suture well-defined at sides, obscured at base; eyes separated by 4 (male)–4.5 (female) times eye widths; gena 0.17 (female)–0.25 (male) times eye length; antennae 4–5 times socket diameters apart; antennae 0.6 (female)–0.7 (male) times body length; antennomere 2 shortest (c. 0.55 times first), <6=8, <3=4, <1=5=7=9=10 (or <7=9=10, <1=5), <11 (1.3–1.4 times 10); antennomeres 7 (not base)–11 densely setose and broader than sparsely setose 1–6; apical maxillary palpomere elongate, fusiform, length c. 1.2 times preapical.

Thorax: pronotal punctures variable on disc, usually large (much larger than on head) and close (separated by 2–4 diameters) but with scattered fine punctures between; punctures larger (1.5–2 times discal puncture widths) and closer (separated by 1–3 diameters) at base and sides; apparently glabrous (fresh specimens with minute recumbent setae at sides), except trichobothrium in each angle; pronotal width 1.5 times length, lateral margins almost straight in basal 2/3, constricted to projecting and acute anterior and posterior angles; anterior edge not or shallowly medially concave; pronotal disc evenly convex; anterior margination incomplete, absent from middle third; hypomeron distinctly punctured and laterally wrinkled; prosternal process elevated between coxae, punctured and pubescent, approximately quadrate, but with elongate apico-lateral lobes and broadly convex apical median lobe; scutellum semi-ovate, finely punctured at base; elytra glabrous; elytron

with deep transverse depression from suture to epipleuron, about 1/3<sup>rd</sup> from base, prominent rounded humerus between base of 5<sup>th</sup> stria and epipleuron, deep transverse depression half distance from base, from epipleuron to middle; striae punctures small and shallow at base (smaller than pronotal disc), large and deep in transverse depressions, often evanescent in apical quarter; elytra striate, with 6–9 distinct striae and sutural stria, scattered large punctures present in basal half outer intervals usually obscuring striae 7–9; upper margin epipleuron complete to base of elytron, curving round humerus to base; mesoventrite median process punctured and pubescent, transverse, strongly arched to slightly concave apical margin, without median depression; metaventrite shining, sparsely pubescent and smooth or shallowly transversely strigose; metaventrite anterior lobe deeply depressed, remainder of anterior border margined with crenulation or pitting; metepisternum slightly rugose, punctate; femora preapically punctured and strigose, more so in larger specimens; tibiae swollen in apical half, midtibiae preapically slightly excavate in large specimens, protibia with dense setal brush, metatibia with preapical long setae on inner face; tibiae strongly punctured, semi-strigose with irregular ridges in large specimens; second metatarsomere approximately equilateral triangular.

Abdomen: ventrites I–IV glabrous, without long setae near midline and with sparse shallow punctures; ventrite V of male sparsely punctured and pubescent in apical half; ventrites I–V with complete lateral keels; apex ventrite V truncate (male) or shallowly convex (female); spiculum relictum with convex apex and large quadrate basal apodeme; penis with narrow mucronate tip in dorsal view, acute and slightly reflexed in lateral view; ostium of penis with slightly exerted paired triangular valves; tegmen Y-shaped broad stem parallel-sided to truncate base, internal keel prominent and evenly convex, absent from base; endophallic sclerite trilobed; apex female sternite VIII truncate to shallowly concave, base with small apodeme; spermatheca U-shaped, slightly bent away from duct, which is variably loosely and tightly coiled.



**FIGURE 119.** Map of eastern Australia, showing distribution of: ○ = *Spilopyra stirlingi* Lea; ▲ = *S. sumptuosa* Baly.

**Notes.** *Spilopyra sumptuosa* was described from 2 specimens, collected by Diggles at Moreton Bay, south-east Queensland. One of these is in BMNH and hereby designated Lectotype. This designation is to clarify the identity of the type species of *Spilopyra* amongst its similar congeners. The other specimen was retained in the Bakewell collection, then passed through the Bates and Oberthür collections to be deposited in MHNP, where it still exists (Horn & Kahle 1935; CAMR pers. obs.). Two other specimens in BMNH labelled ‘type’ in Baly’s handwriting cannot be types but instead are likely to represent specimens comparable with, or compared with, types.

The original description and figures are detailed and easily identify *Spilopyra sumptuosa* by its diagnostic colour pattern. This is the most commonly collected and widespread species of the genus and is well-represented in collections. There are also published records for *Spilopyra sumptuosa*, which are unlikely to be misidentifications, from four localities: Elston, Conondale Range, about 6 miles W of Palmwoods (Wilson 1921), Tamborine (Weise 1923), about 10km NE of Murwillumbah (Hawkeswood 1991) and about 10km NE of Nimbin (Hawkeswood 1992). The larva is also distinctive (Reid 2000), so we have included field collections of these. *Spilopyra sumptuosa* occurs from Mackay in the north to Richmond River in the south in subtropical and riparian forests, 5–635m above sea level. The northernmost locality, Mackay, is 500km from the main range of the species at Gympie and probably represents a mislabelled specimen (it is morphologically identical to other material). There is only minor variation within the range of the species, for example in width of contrasting colour strips, shape of ventral thoracic lobes.

*Spilopyra sumptuosa* has been collected in all months from October to June, except April, with most collections from November to January. First instar larvae were reared from eggs laid in January and a first instar larva was collected in March. Recorded host plants include *Cupaniopsis anacardoides* (Hawkeswood 1991) and *Guioa semiglaucia* (Hawkeswood 1992; Reid 2000), which are widespread in eastern Australia (Hnatuk 1990; Anonymous 2010). A single specimen was collected on *Mischocarpus pyriformis* at Mount Tambourine. *Cupaniopsis*, *Guioa* and *Mischocarpus* are related members of the genus-group *Cupania*, family Sapindaceae (Buerki *et al.* 2009).

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